VOLUME XXXII NUMBER THREE

THE NATIONAL GEOGRAPHIC MAGAZINE

SEPTEMBER, 1917

CONTENTS

The Food Armies of Liberty
The Winning Weapon—Food
HERBERT HOOVER
21 Illustrations

The Geography of Medicines
JOHN A. FOOTE
26 Illustrations

A Few Glimpses into Russia
ZINOVI PECHKOFF
10 Illustrations

Conserving the Nation's Man Power
RUPERT BLUE
17 Illustrations

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

$2.50 A YEAR 25 CTS A COPY

NATIONAL GEOGRAPHIC SOCIETY

HUBBARD MEMORIAL HALL

SIXTEENTH AND M STREETS, WASHINGTON, D. C.

O. H. TITTMANN . . . PRESIDENT
GILBERT H. GROSVENOR, DIRECTOR AND EDITOR
JOHN OLIVER LA GORCE . ASSOCIATE EDITOR
O. P. AUSTIN . . . SECRETARY
JOHN E. PILLSBURY . . VICE-PRESIDENT
JOHN JOY EDSON . . . . TREASURER
GEORGE W. HUTCHISON, ASSISTANT SECRETARY
WILLIAM J. SHOWALTER . ASSISTANT EDITOR
RALPH A. GRAVES . . . ASSISTANT EDITOR

BOARD OF MANAGERS

1915-1917

CHARLES J. BELL
President American Security and Trust Company

JOHN JOY EDSON
President Washington Loan & Trust Company

DAVID FAIRCHILD
In Charge of Agricultural Explorations, Dept. of Agric.

C. HART MERRIAM
Member National Academy of Sciences

O. P. AUSTIN
Statistician

GEORGE R. PUTNAM
Commissioner U. S. Bureau of Lighthouses

GEORGE SHIRAS, 3D
Formerly Member U. S. Congress, Faunal Naturalist, and Wild-Game Photographer

GRANT SQUIRES
New York

1916-1918

FRANKLIN K. LANE
Secretary of the Interior

HENRY F. BLOUNT
Vice-President American Security and Trust Company

C. M. CHESTER
Rear Admiral U. S. Navy, Formerly Supt. U. S. Naval Observatory

FREDERICK V. COVILLE
Formerly President of Washington Academy of Sciences

JOHN E. PILLSBURY
Rear Admiral U. S. Navy, Formerly Chief Bureau of Navigation

RUDOLPH KAUFFMANN
Managing Editor The Evening Star

T. L. MACDONALD
M. D., F. A. C. S.

S. N. D. NORTH
Formerly Director U. S. Bureau of Census

1917-1919

ALEXANDER GRAHAM BELL
Inventor of the telephone

J. HOWARD GORE
Prof. Emeritus Mathematics, The Geo. Washington Univ.

A. W. GREELY
Arctic Explorer, Major Gen'l U. S. Army

GILBERT H. GROSVENOR
Editor of National Geographic Magazine

GEORGE OTIS SMITH
Director of U. S. Geological Survey

O. H. TITTMANN
Formerly Superintendent of U. S. Coast and Geodetic Survey

HENRY WHITE
Formerly U. S. Ambassador to France, Italy, etc.

JOHN M. WILSON
Brigadier General U. S. Army, Formerly Chief of Engineers

To carry out the purpose for which it was founded twenty-eight years ago, namely, "the increase and diffusion of geographic knowledge," the National Geographic Society publishes this Magazine. All receipts from the publication are invested in the Magazine itself or expended directly to promote geographic knowledge and the study of geography. Articles or photographs from members of the Society, or other friends, are desired. For material that the Society can use, adequate remuneration is made. Contributions should be accompanied by an addressed return envelope and postage, and be addressed:

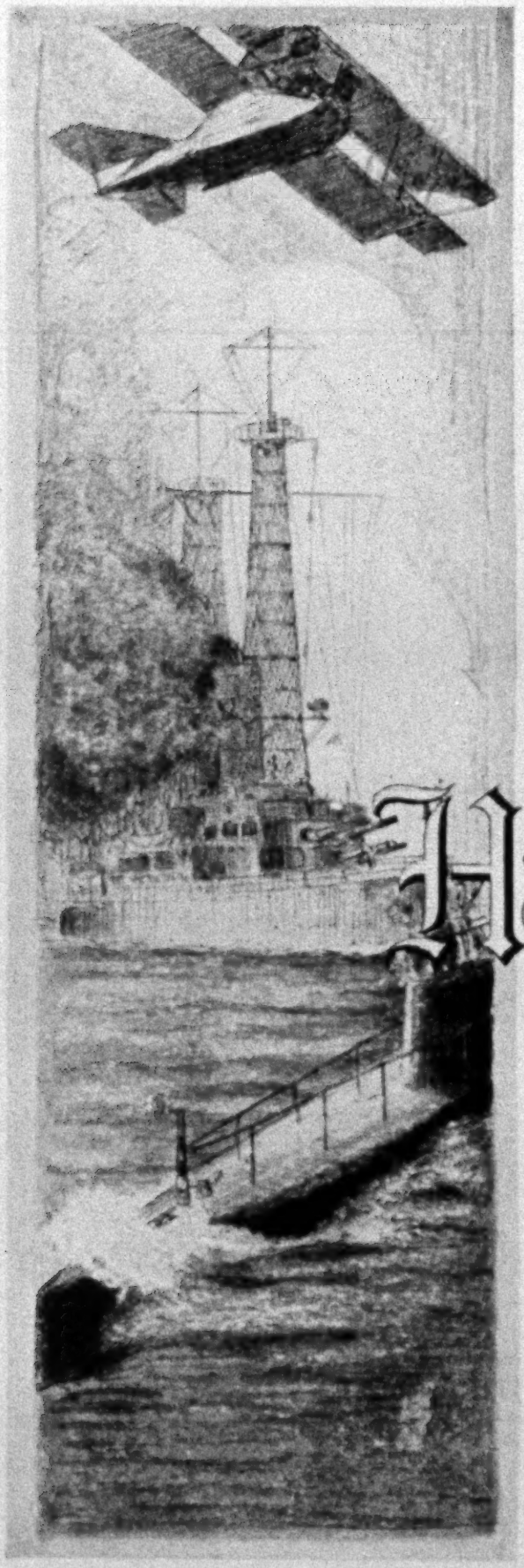
GILBERT H. GROSVENOR, EDITOR

CONTRIBUTING EDITORS

A. W. GREELY
C. HART MERRIAM
O. H. TITTMANN
ROBERT HOLLISTER CHAPMAN
WALTER T. SWINGLE
ALEXANDER GRAHAM BELL
DAVID FAIRCHILD
HUGH M. SMITH
N. H. DARTON
FRANK M. CHAPMAN

Entered at the Post-Office at Washington, D. C., as Second-Class Mail Matter

Copyright, 1917, by National Geographic Society, Washington, D. C. All rights reserved



Defender of Your Time

Modern artillery defends you against invasion. Frowning dreadnoughts, eager air craft, and sullen submarines weave the modern fabric of the national armor of defense. Are you modern in the watch you carry—in your defense against missed trains, fumbled engagements, and the costly hour-errors and minute-misunderstandings that invade and disrupt your days? One distinguished watch attains the apex of modern proficiency —

Hamilton Watch

"The Watch of Railroad Accuracy"

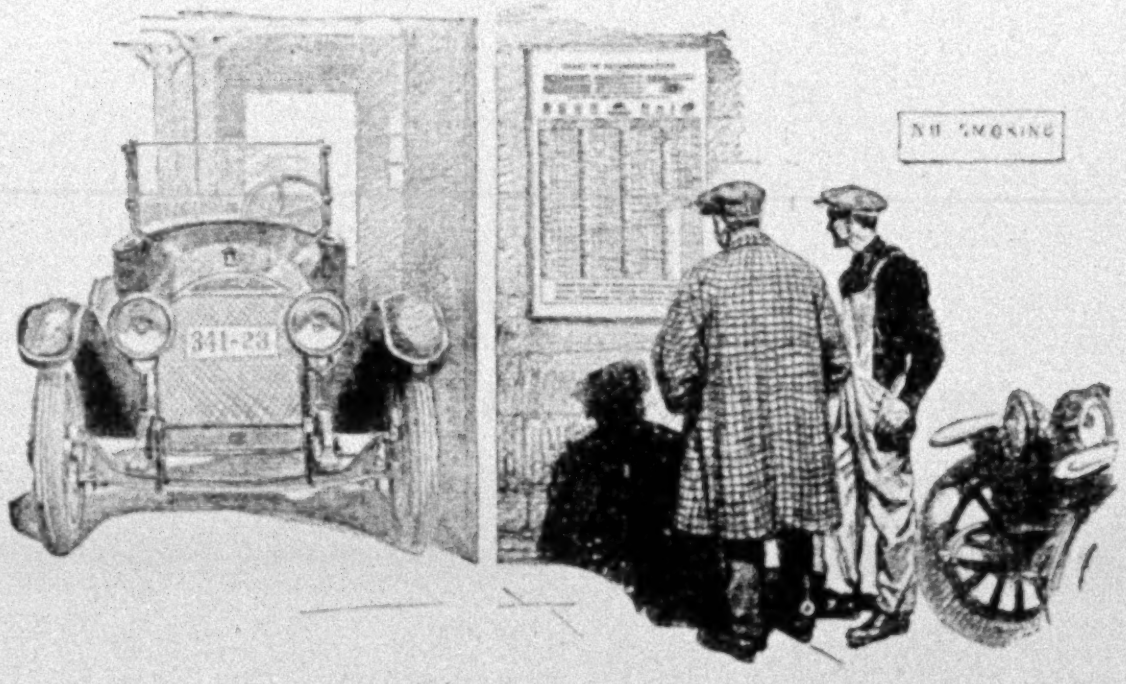
Modern from design to assembly, and from assembly to service. Keyed to the exacting requirements of modern life. Scientifically safeguarded against error, a Hamilton gives you unequaled accuracy along with reliable, dependable, uninterrupted service. Hamilton is the favorite watch of railroads, and is carried by the engineers of America's most famous fliers.

A gallery of 32 quality models to choose from. Prices, $26.50 to $150; movements $13 ($14 in Canada) and up. Every Hamilton guaranteed to give absolute satisfaction. Railroad accuracy plus a lifetime of service.

Send Today for "The Timekeeper"
—the story of Hamilton supremacy

Hamilton Watch Company
Dept. 35 Lancaster, Pennsylvania

Make this Chart your guide



Look for it on your dealer's wall

YOUR oil runs low. You stop for a fresh supply.

You now come to a vital question. What oil will the dealer pour into your oil-reservoir? Will it be just "oil"—or will it be the correct lubricant for *your* engine?

Among thousands of dealers this is what happens:

The dealer recognizes the make of your car—and the year's model. He runs his finger down the Vacuum Oil Company's Chart (shown above in miniature) until he finds your car's make and model. Then he supplies you with the grade of Gargoyle Mobiloils specified for your car by the Chart This oil will effectively seal your piston rings against power-waste, gasoline-waste and oil-waste.

Why are thousands of dealers placing such reliance in this Chart?

Experience has taught them that something like 50% of all engine troubles are due to incorrect lubrication.

They realize that scientific lubrication is a problem for specialists. Since the dealer has neither time nor equipment for studying this intricate subject he draws on the experience of a recognized authority.

That is why you find on his walls the large Chart of Recommendations, issued by the Vacuum Oil Company.

If you inquire about the Chart you will find this:

The Vacuum Oil Company for 50 years have specialized in scientific lubrication. Today their world-wide leadership in lubrication matters is unquestioned in scientific circles.

For years their Chart of Recommendations has been recognized as the scientific guide to correct automobile lubrication

In keeping this Chart up to date, each

new model of every automobile is carefully analyzed. This work involves lengthy and painstaking engineering study by the Vacuum Oil Company's Board of Engineers. The recommendations of this Chart are proven correct by repeated practical tests.

But nothing has given dealers such faith in this Chart as their experience with the oils themselves. For no one knows better than the dealer how difficult it is to secure efficient lubrication—and how much efficient lubrication means.

Write for new 56-page booklet containing complete discussion of your lubrication problems, list of troubles with remedies and complete Charts of Recommendations for Automobiles, Motorcycles, Tractors and Motor-boat Engines.

GARGOYLE

Mobiloils

A grade for each type of motor

The four grades of Gargoyle Mobiloils for gasoline motor lubrication, purified to remove free carbon, are:

Gargoyle Mobiloil "A"
Gargoyle Mobiloil "B"
Gargoyle Mobiloil "E"
Gargoyle Mobiloil "Arctic"

Electric Vehicles — For motor bearings and enclosed chains use Gargoyle Mobiloil "A" the year 'round. For open chains and differential use Gargoyle Mobiloil "C," the year 'round.

Exception—For *winter lubrication* of pleasure cars use Gargoyle Mobiloil "Arctic" for worm drive and Gargoyle Mobiloil "A" for bevel gear drive.

In buying Gargoyle Mobiloils from your dealer, it is safest to purchase in original packages. Look for the red Gargoyle on the container. If your dealer has not the grade specified for your car, he can easily secure it for you.

VACUUM OIL COMPANY
Rochester, N. Y. U. S. A.

Specialists in the manufacture of high-grade lubricants for every class of machinery. Obtainable everywhere in the world.

Domestic Branches: Detroit, Boston, New York, Kansas City, Kan., Chicago, Philadelphia, Indianapolis, Minneapolis, Pittsburgh, Des Moines

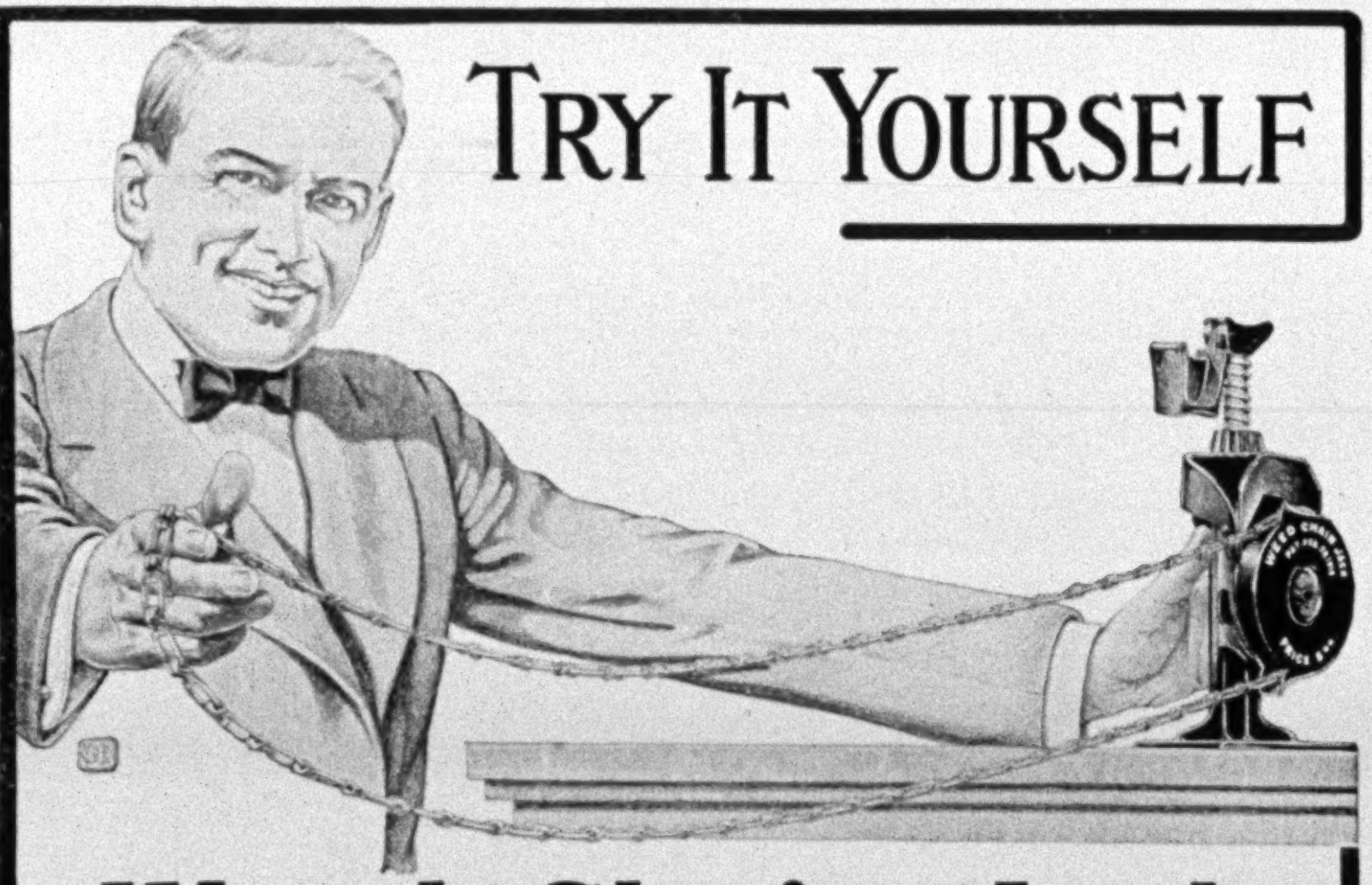
Correct Automobile Lubrication

Explanation: In the Chart below, the letter opposite the car indicates the grade of Gargoyle Mobiloils that should be used. For example, "A" means Gargoyle Mobiloil "A". "Arc" means Gargoyle Mobiloil "Arctic," etc. The recommendations cover all models of both pleasure and commercial vehicles unless otherwise noted.

This Chart is compiled by the Vacuum Oil Co.'s Board of Engineers and represents our professional advice on Correct Automobile Lubrication.

Model of	1917		1916		1915		1914		1913	
CARS	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Abbott-Detroit	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
" (8 cyl)			A	A	A	A				
Allen	A	Arc	A	Arc	A	Arc	A	A	A	A
" (Mod. 33-34-35)					A	Arc				
Apperson	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A	A	A						
Auburn (4 cyl)			A	Arc	A	Arc	A	A	A	A
" (6 cyl)	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc		
Autocar (4 cyl)	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Avacar	A	Arc	A	Arc	A	Arc	A	Arc		
" (8 cyl)			A	A						
Buick	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc	A	Arc
Cadillac							Arc	Arc	Arc	Arc
" (8 cyl)	A	A	A	A	Arc	Arc				
Case	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Chalmers			Arc	Arc	Arc	Arc	A	A	Arc	Arc
" (Mod. 6-40)			A	Arc						
" (Mod. 6-30)	A	A	A	A						
Chandler Six	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc		
Chevrolet	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc	A	A
Cole			Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A	A	A	A	A				
Cunningham			Arc	Arc	Arc	Arc	Arc	Arc	A	A
" (8 cyl)	A	A	A	A						
Dort	A	Arc	A	Arc	Arc	Arc	A	A	A	Arc
" (Mod. C)	A	Arc	A	Arc	A	Arc	A	A		
Detroiter	Arc	Arc	Arc	Arc	A	Arc	A	A	A	Arc
" (8 cyl)					Arc	Arc				
Dodge	A	Arc	A	Arc	C	E				
Elcar	A	Arc	A	Arc	A	Arc				
Empire (4 cyl)	A	Arc	A	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (6 cyl)	Arc	Arc	Arc	Arc						
Federal	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Ford	B	A	B	A	B	A	B	A	B	A
Franklin	E	E	E	E	E	E	E	E	E	E
Franklin	A	A	A	A	A	A	A	A	A	Arc
Grant	A	Arc	A	Arc	Arc	Arc	Arc	Arc		
Hal-Twelve	A	A	A	A						
Hayes	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
" (12 cyl)	A	A	A	A						
Hudson			Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
" (Super Six)	A	Arc	A	A						
Hupmobile	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Jeffery	A	Arc	A	Arc	A	Arc	A	A		
" (6 cyl)	A	A								
" Cont'l	A	Arc	A	Arc	A	Arc	Arc	Arc	Arc	Arc
Kissel			E	E	E	E				
" Cont'l	A	Arc	A	Arc	A	Arc				
Kelly Springfield	A	A	A	A	A	A	A	A	Arc	Arc
King					A	Arc	A	A	A	E
" (8 cyl)	A	A	A	A	Arc	Arc				
" Cont'l	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc		
Kissel Kar	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
" " Cont'l	A	Arc	A	Arc	A	Arc	A	Arc	Arc	Arc
" " (Mod. 48)			A	A	A	A	A	A		
" " (12 cyl)	A	A								
Lexington	Arc	Arc	Arc	Arc	Arc	Arc				
Leyland Stewart	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" " (Mod. 32)	A	Arc	A	Arc						
" " (Mod. M-6)	A	Arc								
Locomobile	E	E	E	E	E	E	E	E	Arc	Arc
McFarlan	A	Arc	A	A	A	Arc	A	A	A	Arc
Marmon	A	A	A	A	A	Arc	A	A	A	Arc
Maxwell	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Mercer	A	A	A	A	A	Arc	A	Arc	A	Arc
" (22-70)					Arc	Arc				
Mitchell	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Mitchell (8 cyl)			A	A						
Moline									A	Arc
" Knight	A	A	A	A	A	A	A	A		
Moon (4 cyl)					Arc	Arc	A	Arc	Arc	Arc
" (6 cyl)	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc		
National	Arc	Arc	A	Arc	A	Arc	A	A	A	A
" (12 cyl)	A	A	A	A						
Oakland	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
" (8 cyl)			A	A						
Oldsmobile			Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A	A	A						
Overland	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Packard					A	Arc	A	Arc	Arc	Arc
" (12 cyl)	A	A	A	A						
" Cont'l	A	A	A	A	A	A	Arc	Arc	Arc	Arc
Paige					A	Arc	A	A	A	E
" (6-46)	Arc	Arc	Arc	Arc	Arc	Arc				
" (6-36 & 56)	A	Arc	A	Arc	A	Arc				
Pathfinder	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
" (12 cyl)	A	A	A	A						
Peerless	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A	A	A						
Pierce Arrow	A	A	A	A	Arc	Arc	Arc	Arc	Arc	Arc
" Cont'l	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Premier	A	A	A	A	A	Arc	A	A	A	Arc
Regal	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)			A	A	Arc	Arc				
Reliance (Farmer)			A	Arc	A	Arc	A	Arc	A	Arc
Reo	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Richmond	Arc	Arc	Arc	Arc	A	Arc	A	Arc	Arc	Arc
Rider	E	E								
Saxon	E	E	E	E	E	E	E	E		
Selden	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Simplex	A	A	A	A	Arc	Arc	Arc	Arc	Arc	Arc
Stearns Knight	A	A	B	A	B	A	B	A	A	A
" " (8 cyl)	A	A	B	A						
Studebaker	A	Arc	A	Arc	Arc	Arc	A	Arc	A	Arc
Stutz	A	A	A	A	A	A	A	A	Arc	Arc
Velie (4 cyl)					A	Arc	A	Arc	A	Arc
" (6 cyl)	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc		
Westcott	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
White	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (10 valve)	A	A								
Willys Knight	A	A	B	A	B	A	A	A		
Willys Six	Arc	Arc								
Winton	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc

TRY IT YOURSELF



Weed Chain-Jack

The Jack That Saves Your Back

Simply a few pulls on its chain and the heaviest car is raised or lowered without danger and without exertion

To operate a Weed Chain-Jack it is not necessary to get down in a cramped strained position and grovel in mud, grease or dust under a car to work a "handle" that is apt to fly up with unpleasant results. ***To lift a car*** with the Weed Chain-Jack, simply give a few pulls on its endless chain while you stand erect—clear from springs, tire carriers and other projections. ***To lower a car*** pull the chain in opposite direction. Up or down—there's no labor.

Made in Four Sizes

Powerful — Safe — Easily Operated

Never gets out of order. Gears and chain wheels protected by a stamped steel-housing. ***Chain heavily plated*** to prevent rusting. ***Has a strong cap,*** providing the kind of support from which an axle will not slip, while a ***broad base*** prevents the jack from upsetting on uneven roads. ***Every Weed Chain-Jack*** is submitted to a lifting test and will support over twice the weight it is ever required to lift. ***Try it yourself.***

Size	Height When Lowered	Height When Raised	Height When Raised with Auxiliary Step Up
8 inch	8 inches	12½ inches	14½ inches
10 inch	10 inches	15⅞ inches	17⅞ inches
12 inch	12 inches	18½ inches	No Aux. Step
12 in. Truck	12 inches	19¼ inches	No Aux. Step

The 8 inch and 10 inch sizes are made with an auxiliary step as illustrated above. When in operative position this step adds two inches to the height of the Jack.

10 Days' Trial If your dealer does not have them, send $5.00 for any size for pleasure cars or $10.00 for the Truck size, and we will send you one, all charges prepaid. For delivery in Canada send $6.00 for any size for pleasure cars or $12.00 for the Truck size. Try it 10 days. If not satisfied, return it to us and we will refund your money. Use the coupon.

American Chain Company, Inc.

Bridgeport A C **Connecticut**

In Canada: Dominion Chain Company, Limited, Niagara Falls, Ont.

Largest Chain Manufacturers in the World

The Complete Chain Line—all types, all sizes, all finishes—from plumbers' safety chain to ships' anchor chain.

TRIAL COUPON

American Chain Co. Inc.
Dept. L , Bridgeport, Conn.

Gentlemen:

Enclosed find $5.00 / 10.00. Send me a Weed Chain-Jack (size ____ in.) It is understood I am to try it for 10 days and if not satisfied, I am to return it and you will refund the purchase price.

Name .....

Address .....

.....

Digesting By
Steam Power

Why Wheat Grains Are Shot from Guns

The purpose in Puffed Grains, Puffed Wheat or Puffed Rice, is to make digestion easy and complete.

Digestion usually consumes much energy, because the food cells are not broken. Here we blast the food cells by creating in each kernel a hundred million steam explosions.

That's why the grains are shot from guns. That's why they come out puffed to eight times normal size. It is Prof. Anderson's process for scientific grain-food preparation.

The result is bubble-like grains—thin, crisp, and toasted—with a fascinating taste. They seem like food confections, but they are really whole grains made wholly digestible without any tax on the stomach.

Puffed Wheat

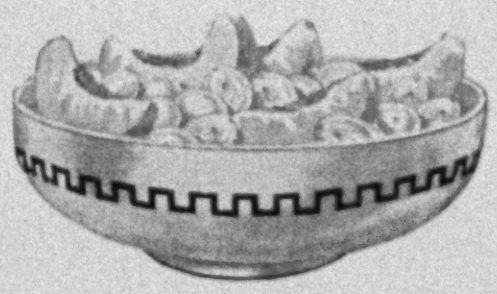
Puffed Rice

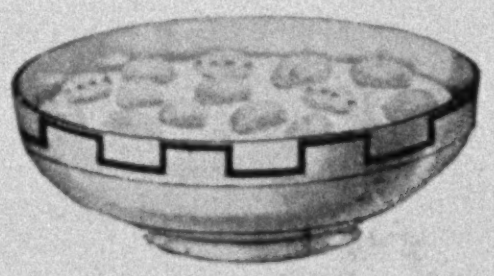
and Corn Puffs

Each 15c Except in Far West

That is the reason for Puffed Grains. They are not mere tidbits for a gala-day breakfast. They are every-day foods and all-hour foods of the very highest order. And their frequent use supplies what flour foods lack.

The more you serve the better your folks are fed. Serve with cream and sugar, in bowls of milk, or mixed with any fruit. Use as nut-like garnish on ice cream, or as wafers in soup. Douse with melted butter, like peanuts or popcorn, for an after-school delight.





The Quaker Oats Company

Sole Makers

(1682)

This Bridge Was Built of Concrete

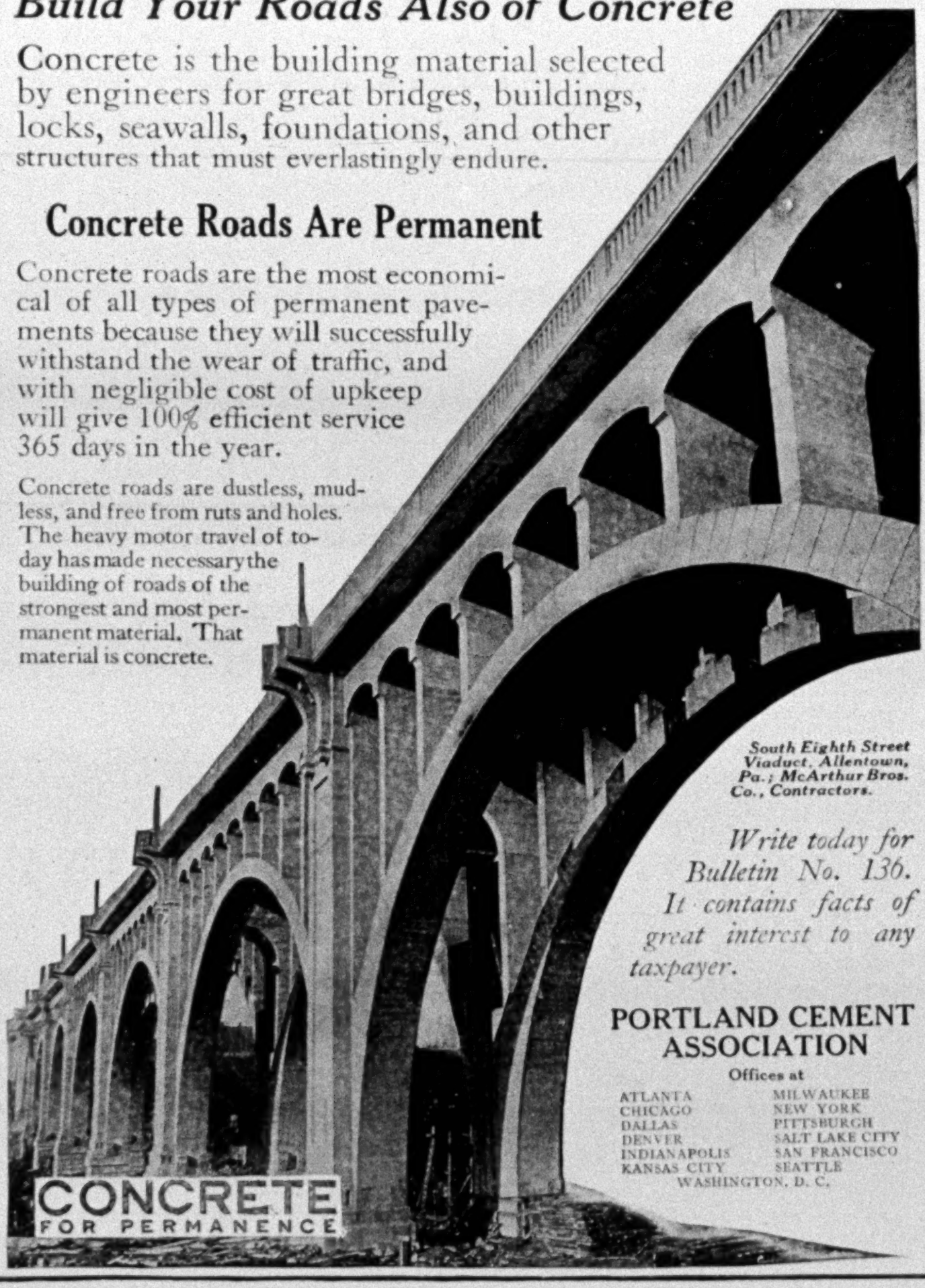
Build Your Roads Also of Concrete

Concrete is the building material selected by engineers for great bridges, buildings, locks, seawalls, foundations, and other structures that must everlastingly endure.

Concrete Roads Are Permanent

Concrete roads are the most economical of all types of permanent pavements because they will successfully withstand the wear of traffic, and with negligible cost of upkeep will give 100% efficient service 365 days in the year.

Concrete roads are dustless, mudless, and free from ruts and holes. The heavy motor travel of today has made necessary the building of roads of the strongest and most permanent material. That material is concrete.



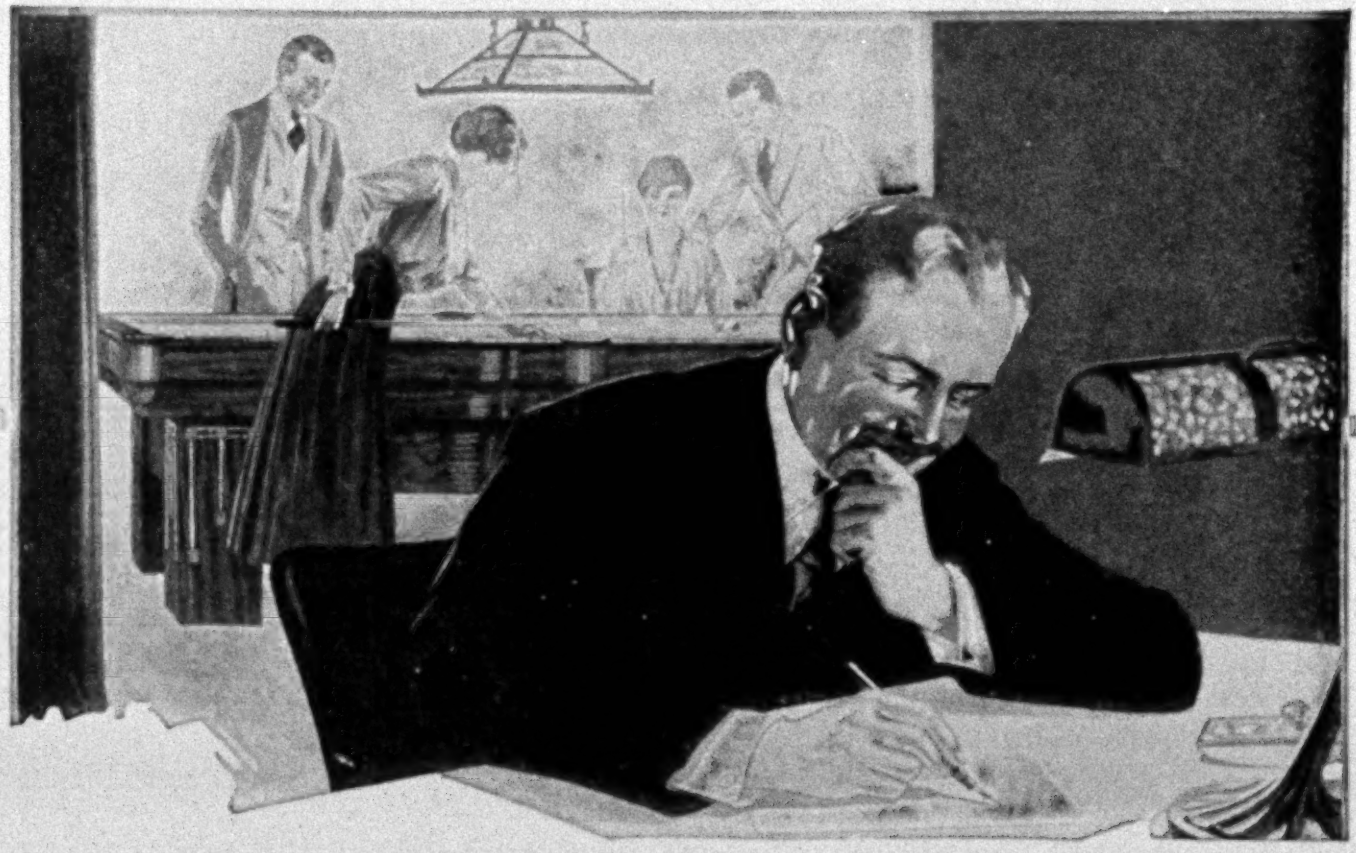
South Eighth Street Viaduct, Allentown, Pa.; McArthur Bros. Co., Contractors.

Write today for Bulletin No. 136. It contains facts of great interest to any taxpayer.

PORTLAND CEMENT ASSOCIATION

Offices at

ATLANTA
CHICAGO
DALLAS
DENVER
INDIANAPOLIS
KANSAS CITY
MILWAUKEE
NEW YORK
PITTSBURGH
SALT LAKE CITY
SAN FRANCISCO
SEATTLE
WASHINGTON, D. C.



One Father Writes of

BILLIARDS

"We've a Full House All the Time!"

Put a Brunswick Carom or Pocket Billiard Table in your home and watch how quickly it surrounds your boys and girls with good companions.

Young people idolize Home Billiards. And these princely contests act as a tonic on older folks.

Carom and Pocket Billiards are never twice alike, but ever enlivened by friendly jest and laughter. Among life's most enduring memories are the happy hours and comradeship of billiards.

BRUNSWICK HOME BILLIARD TABLES

Even the cottage or small apartment has room for a genuine Brunswick. And it gives you *scientific* Carom and Pocket Billiards—life, speed, and accuracy!

The "Baby Grand" is a home-size regulation table for spare rooms, attics, basements and private billiard rooms.

The "Quick Demountable" can be set up anywhere and easily folded away when not in play.

See these tables in handsome color reproductions, get our low prices, easy terms, and home trial offer. All contained in our new billiard book. Send your address at once for free copy.

THE BRUNSWICK-BALKE-COLLENDER CO.

Dept. 53 P, 623-633 S. Wabash Ave., Chicago

DEALERS: Write at once for attractive agency proposition

Low Prices, Easy Terms Balls, Cues, Etc., Given

Brunswick prices today are extremely low for tables of such masterly construction and beauty.

Our Popular Purchase Plan lets you play while you pay.

With every table we give a high-class Playing Outfit Free—Balls, Cues, Rack, Markers, and Expert Book of 33 Games, etc.

Send for Billiard Book Free

THE BRUNSWICK-BALKE-COLLENDER CO.

Dept. 53 P, 623-633 S. Wabash Ave., Chicago

You may send me a free copy of your color book—

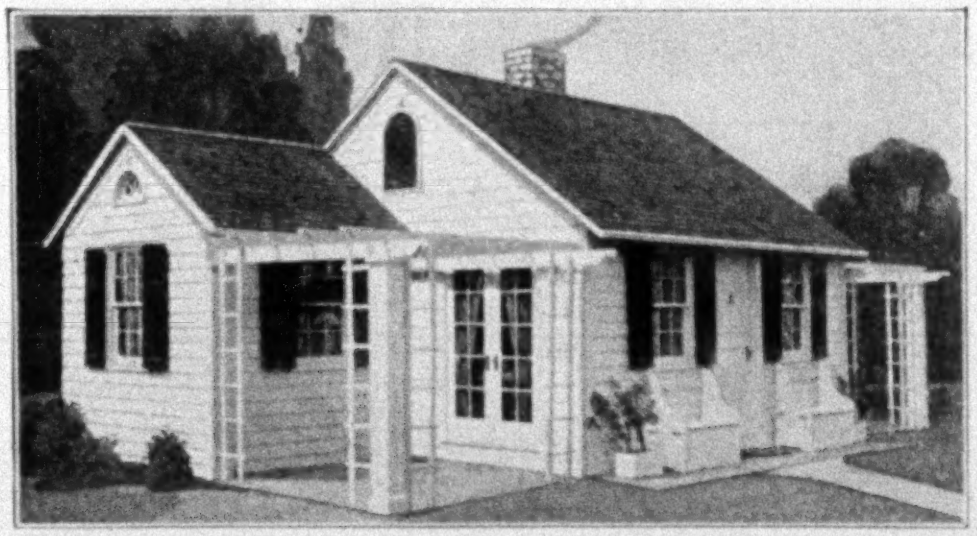
"Billiards—TheHomeMagnet"

and tell about your home trial offer.

Name .....

Address .....

Select Any Building Site, then Send for the Bossert Catalog



THERE is no similarity in principle, quality, method of joining or final result between Bossert Houses and take-down houses of temporary character.

At a surprisingly small expense and with none of the muss and fuss of ordinary building you can have one of the famous Bossert Houses of far stronger construction than the ordinary frame building.

THE house shown above is an all-year-round dwelling, double-walled air space. Outside painted three coats white, blinds painted green, roof stained green, with oiled finish inside. Contains five rooms, including bath, weight about 21,000 pounds.

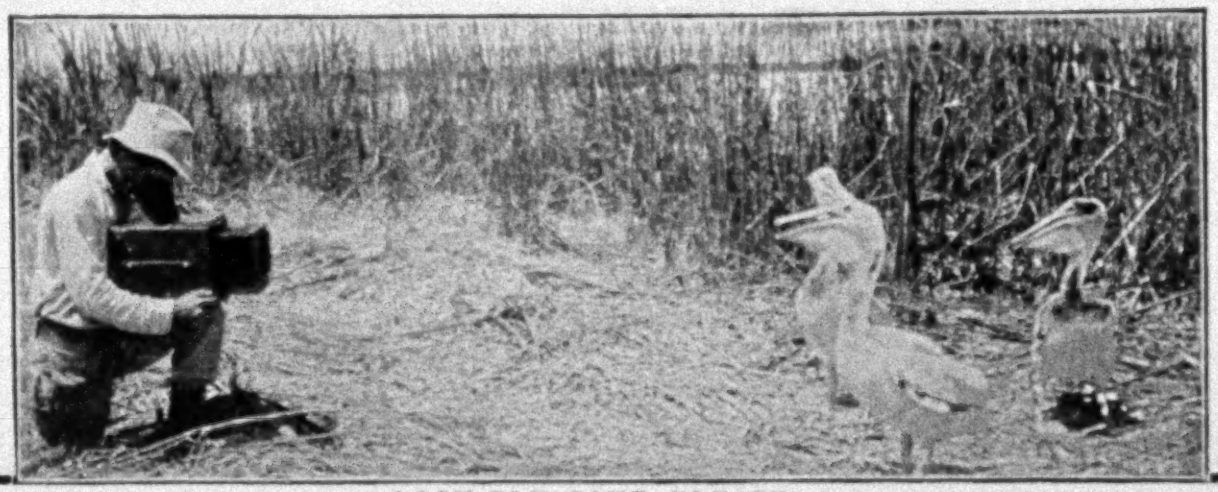
As a result of the heavy demand on the part of the public for Bossert Houses, we are continually working on prior orders. It is to the buyer's interest and benefit to order as far ahead as possible, as all orders are finished in rotation as booked.

PRICE, TWELVE HUNDRED AND SIXTY-FIVE DOLLARS ($1,265) F. O. B. BROOKLYN

Send 12 cents today for complete catalog showing how we can give you any style and price house you want

LOUIS BOSSERT & SONS, Inc., 1313 Grand Street, Brooklyn, New York

The Promise of a Good Cup
WHITE HOUSE
ORANGE PEKOE
TEA
DWINELL-WRIGHT CO.
BOSTON-CHICAGO
WHITE HOUSE
COFFEE
DWINELL-WRIGHT COMPANY
BOSTON-CHICAGO
White House
BRAND
Coffee and Teas
Users come to anticipate meal time for the keen enjoyment afforded by these favorite beverages. They are of such unvarying quality that the mention of "White House Coffee and Teas" to one familiar with them recalls their delicious flavor. Sold only in 1, 2, 3 and 5-lb. packages—never in any other way.
AN UNBROKEN LABEL SEALS THE CAN AND IS OUR GUARANTEE OF GENUINENESS.
Over 25,000 dealers in United States supply their trade with these superior goods. Your dealer can supply you—ask him.
Principal Coffee Roasters
DWINELL-WRIGHT COMPANY Boston—Chicago



LOOK PLEASANT, PLEASE!

Something New—And Different

If you are an outdoor enthusiast, you will certainly "sit up and take notice"—just as Mr. and Mrs. Pelican are doing—when you get your first peep at a new work, now at last ready after many months of labor. Pictures of rare beauty greet you in the first complete study of the BIRDS OF AMERICA ever published,

"The Book of a Thousand Birds"

Not since the days of Audubon has a work of such interest and authority appeared. Mr. T. Gilbert Pearson, Secretary of the National Association of Audubon Societies, is editor-in-chief; Mr. John Burroughs is consulting editor; and famous ornithologists all over the land have assisted—such men as Finley and Bohlman of the Pacific coast, Forbush of Massachusetts, Horsfall, Brasher, Job, Lottridge, and many others. They have given us life histories of every bird in America. Hundreds of graphic field pictures and drawings reinforce the delightful, story-telling text and careful scientific descriptions; while, as a crowning feature of the illustrations, there are three hundred species shown in FULL COLOR, from the famous originals of L. A. Fuertes. But this is only one of many attractions in the new

JUST *Nature Lovers Library* PUBLISHED

SIX LARGE VOLUMES 2,000 PAGES 5,000 SUBJECTS

Mammals of America

Over 500 of our four-footed friends are found here, with some of the finest wild-life pictures ever taken. Like the birds, it is a *complete* study, including many forms that are rapidly disappearing. The editor-in-chief is Mr. H. E. Anthony, of the American Museum of Natural History, and many naturalists and sportsmen have ably assisted.

Old World Animals

Birds, Mammals, Fishes, Reptiles, Amphibians, Insects, and Lower Forms of Life all over the globe—down to the mass of jellyfish floating on the seashore—are told about in other sections. The pictures have been called the most marvelous ever obtained, for all, even the rarest forms, are taken from life—some under water.

We Want You to See These Unusual Books at Our Expense

They are like nothing else that you have ever seen, and will just fill that gap in your library. Young folks are equally delighted and will find a constant inspiration to gain that broader knowledge of the great outdoors. And so we want merely the privilege of sending you these remarkable books for your personal inspection. Just return the inspection blank below; or, if you do not wish to cut the magazine, write us, mentioning offer. But do not delay, please, as the special introductory price here quoted pertains only to a limited first edition. When these books are gone the price must advance, on account of increasing cost of all book materials.

INSPECTION BLANK

NATURE LOVERS LEAGUE OF AMERICA, INC., 44 East 23d Street, New York City.

GENTLEMEN: As per your introductory offer, I wish to inspect, at your expense, a complete set of your new Nature Lovers Library, just off the press, containing Birds, Mammals, Fishes, Insects, and all other forms of animal life. If the books are satisfactory, I agree to pay you $1 within five days and $2 a month until the publication price of $29.50 is paid (or $28 cash). If I do not wish to keep the books, I shall notify you at once, and hold them subject to your order.

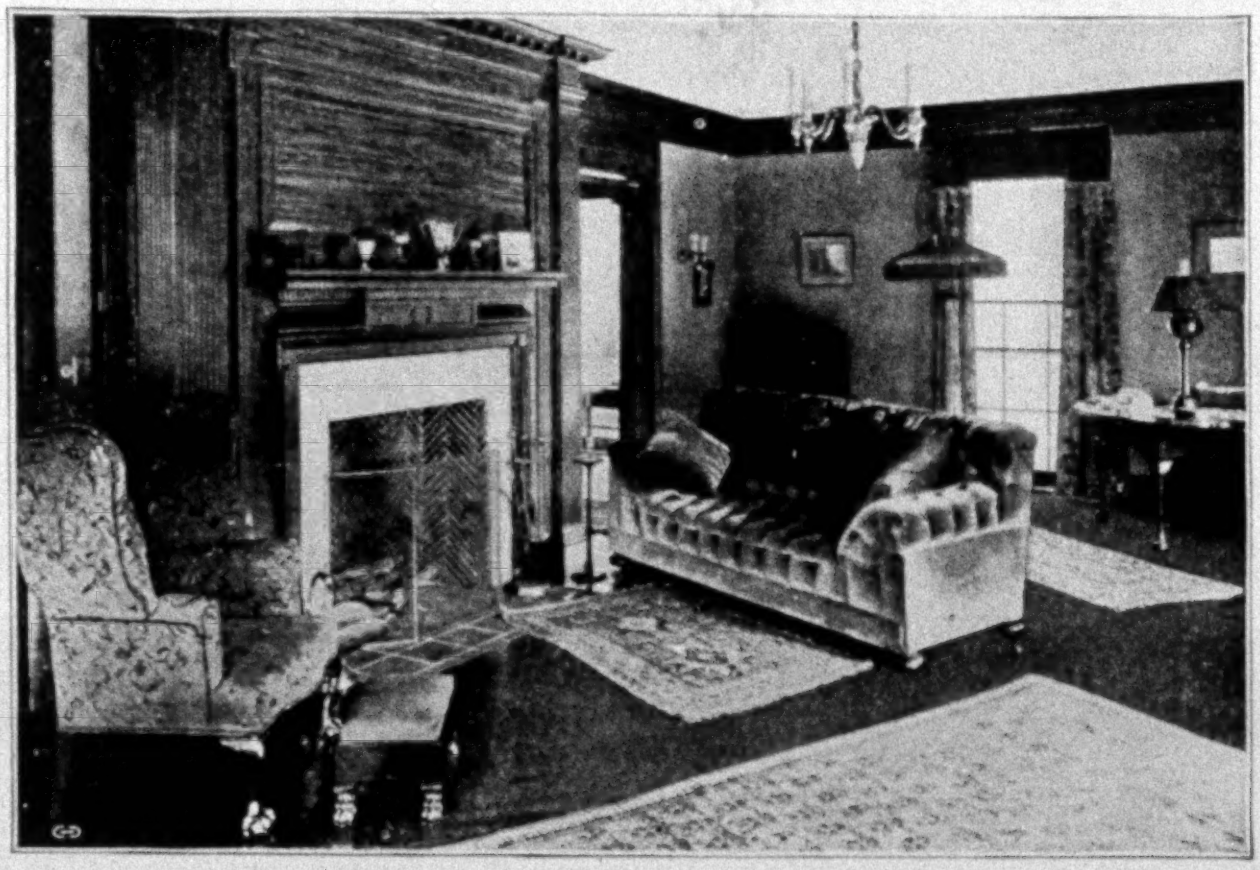
Name..... *Occupation*.....

Street..... *City and State*.....

G. M. 9-17

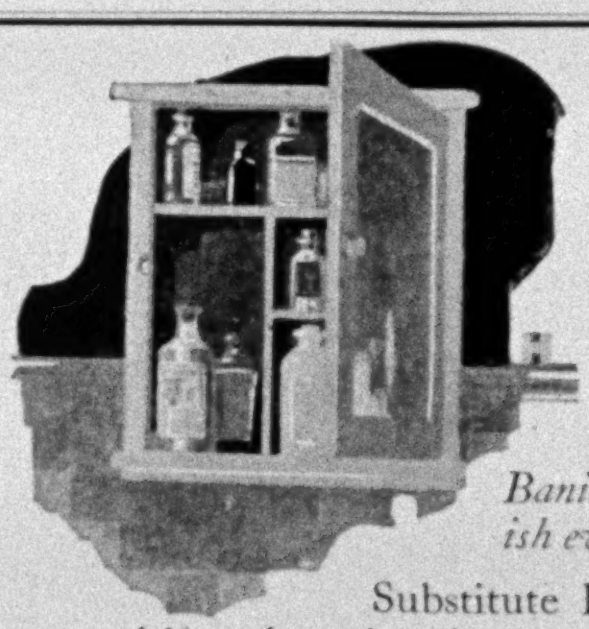
RED GUM *"AMERICA'S FINEST CABINET WOOD"* RED GUM

AN ENDURING HARDWOOD, YET SOFT AS SATIN TO THE TOUCH. ITS NATURAL TONE A RICH, WARM BROWN, A JOY TO THE EYE."



EUROPE WAS USING AMERICAN RED GUM FOR FINE CABINET WORK YEARS BEFORE AMERICA'S PRIDE AWOKE TO ITS OWN.

Enjoy Beauty! Write for Samples GUM LUMBER MFRS. ASSN 1311 Bank of Commerce Bldg. MEMPHIS, TENN. *With Knowledge? Write for Booklet*



Do You Shudder

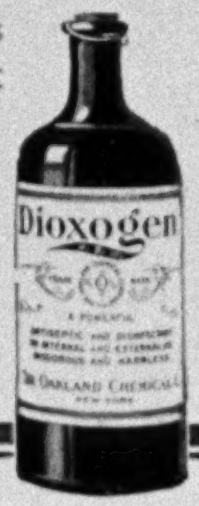
every time the medicine chest is opened at night, for fear that Iodine will be taken in place of Jamaica Ginger or Bichloride instead of Soda Mint?

Banish Bichloride from the medicine chest—banish every antiseptic which endangers human life.

Substitute DIOXOGEN, which does everything that the dangerous antiseptics can do, but does it *safely*, without the slightest particle of risk.

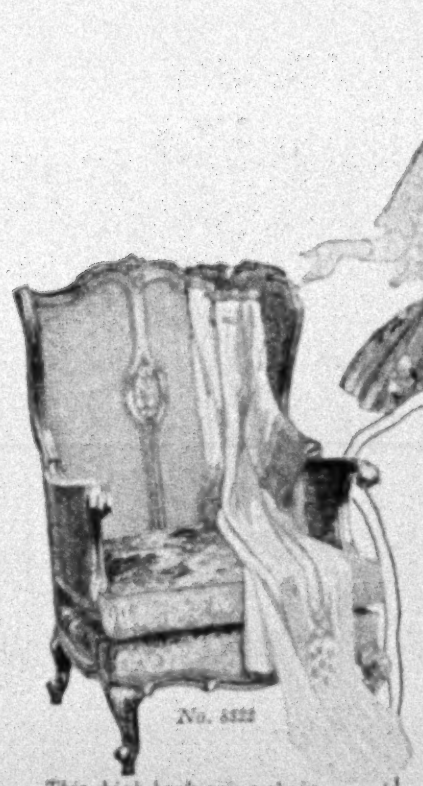
No disease germ can live in the presence of DIOXOGEN, yet DIOXOGEN is *safe enough* to be used by a child.

THE OAKLAND CHEMICAL CO., 10 ASTOR PLACE, N.Y.



Dioxogen

"Mention the Geographic—It identifies you."



No. 8322

This high-back wing chair, in the Chippendale period, is graceful in outline and artistic in carving, with Karpenesque cushions. It is part of a complete living-room suite in the same period.

IN the lines of Karpen Furniture there is as much grace as in a woman's floating draperies. In its fine woods and rich fabrics, there is the same luxuriousness as in her furs and satins; and in its subdued elegance, the fitting background for her beauty.

Karpen Furniture

is the furniture which charming women choose for their homes—dignified, handsome, splendidly comfortable. Its possession is a lasting one; its beauty outlives changing fashions.

Send for Book 109 of Karpen Designs

showing hundreds of Karpen pieces in modern and period designs, obtainable singly or in suites. Mailed on receipt of 14c in stamps.

S. KARPEN & BROS.

900 S. Michigan Ave., Chicago 37th St. and Broadway, New York

Karpen Guaranteed Upholstered Furniture

TWO BOOKS WHICH MADE HISTORY

"The books and speeches of James M. Beck and our present-day duties should be studied by every real American."—THEODORE ROOSEVELT.

The Evidence in the Case

"For the clearness of its statements and the cogency of its legal argument it has not been surpassed, if indeed it has been equalled, by any writer since the war began."—LORD BRYCE, *Formerly Ambassador for England to the United States.*

"It seems to me in every respect a most able and admirable statement of the case. A masterly analysis of the diplomatic records. I have read it with great admiration."—ARTHUR JAMES BALFOUR, *Formerly Prime Minister of England.*

Part or all of this book has been printed in SEVEN LANGUAGES

More than 1,000,000 copies sold. 14th Large American Printing. 12°. Over 300 pages. $1.25 net. (By mail, $1.35)

The War and Humanity

3d Edition. Revised and Enlarged

"Mr. Beck's volume was a classic the moment it appeared. We know of no more logical and lucid discussion of the essential facts and problems of the great war, nor any more truly consistently and even vigorously American in its spirit."—*N. Y. Tribune.*

"One of the most virile and convincing books that the great war has produced in any country of the world."—*N. Y. Sun.*

12°. 400 pages. $1.50 net. (By mail, $1.60)

AT ALL BOOKSELLERS

NEW YORK **G. P. PUTNAM'S SONS** LONDON

House on Fresh Pond Parkway, Cambridge, Mass. Charles R. Greco, Architect, Boston, Mass.

ALL woods have certain uses for which they are especially adapted by reason of the peculiar qualities and characteristics which nature has given them; and on their proper selection for these uses, hinges the whole problem of economy in wood construction.

Three centuries of experience in this country have demonstrated that no other wood lasts as long or gives such satisfactory service as

WHITE PINE

for outside finish lumber—siding and corner boards; window sash, frames and casings; outside doors, door frames and casings; outside blinds; all exposed porch and balcony lumber; cornice boards, brackets, ornaments and mouldings; and other outside requirements, *not* including shingles.

If your lumber dealer is unable to supply White Pine, we should appreciate the opportunity of being helpful to you in securing it.

Address WHITE PINE BUREAU,
1923 MERCHANTS BANK BUILDING, ST. PAUL, MINN.

Representing
The Northern Pine Manufacturers' Association of Minnesota, Wisconsin and Michigan, and The Associated White Pine Manufacturers of Idaho

"White Pine in Home-Building" is beautifully illustrated and full of valuable information and suggestions on home-building. Send today for this booklet—free to all prospective home-builders.

"The Helen Speer Book of Children's White Pine Toys and Furniture"—a fascinating children's plan book, from which a child may build its own toys and toy furniture. Prepared by Helen Speer, the toy expert. If there are children in your home, sent free on request.

Elgin Streamline

$50-

In Solid Gold • •

The Streamline Series of Watches

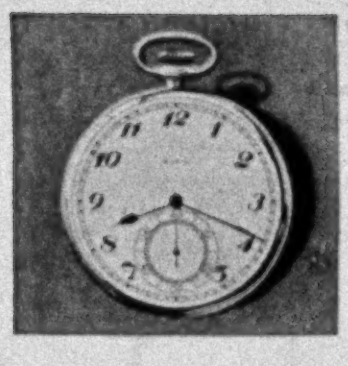
for men brings the Elgin Company into the limelight as designers of *complete* watches.

For fifty years this great organization has designed and built watch *movements* of world famous excellence. Now it is designing both movement and case as a complete unit, under the sweeping Elgin guarantee.

The Streamline is a man's watch, dressed in a style that will last—perfect balance, perfect harmony of case and movement.

The design is notable for its smoothly flowing lines. The "close up" view at the left shows how the bow flows into the pendant, and the pendant into the curve of the case. The clear, spacious dial is equally distinctive.

Your Jeweler will take pride in showing you this new $50 Streamline and the $25 Streamline previously announced, also Elgin Bracelet Watches for women. Illustrated folders on request.



The $50 Streamline comes to your Jeweler complete in Solid Gold case and individual presentation box. The movement is the celebrated G. M. Wheeler model, with 17 Jewels and 5 adjustments • • • *The same watch in 14 Karat Gold Filled, complete at $35* •

• MADE IN ELGIN, U.S.A. •

ELGIN NATIONAL WATCH CO., ELGIN, U.S.A.

Designers and Producers

"Mention the Geographic—It identifies you."

WHY

Every Home Owner and Builder should consider

THE TRENTON POTTERIES COMPANY

"Bathrooms of Character"

Write for our interesting and instructive booklet, "Bathrooms of Character." It shows how to plan your bathroom and arrange your fixtures. Ask for Booklet P-27

In the first place, we want you to appreciate that our products are American Premier Products in their line. The matter of cost is unimportant compared with the ultimate satisfaction to you from the possession of superior material. Always remember the labor charge, a big item of the entire cost, is the same in cheap, useless material as upon the best.

To the uninitiated, plumbing fixtures all look alike—the difference is one of years. Almost any fixture is good for a year or two—but after that you will conclude that the best is none too good.

All fixtures are white. The surface glazed? Yes. *But,* The Trenton Potteries Company China Fixtures have the enamel baked on a clay body—very different from what you may get on a cheaper fixture (very little cheaper).

Clay products differ. A manufacturer who skimps the baking has a glaze that is soft. We *guarantee* our ware is subjected to heat of not less than 2400 degrees—often more. It means the hardest possible *surface* and the hardest possible ware *beneath* the surface. It means years of service after poorer made plumbing fixtures are defaced and hammered beyond recognition.

Naturally, you pay a little more for such fixtures. They cost more to produce; but your bathroom and kitchen look so much better.

Makers of the

SI-WEL-CLO

SILENT CLOSET

THE TRENTON POTTERIES COMPANY

TRENTON, NEW JERSEY, U. S. A.

World's Largest Maker of Fine Plumbing Fixtures

It's *true home insurance* to secure The Trenton Potteries All-Clay Plumbing Fixtures. Tell any plumber you want them and look for the trade-mark stamped under the glaze.

This Magazine is from Our Presses

Judd & Detweiler, Inc.

Master Printers

420-422 Eleventh Street Washington, D. C.

What 15 cts. Will Bring You From the Nation's Capital

Washington, the home of the Pathfinder, is the nerve-center of civilization; history is being made at this world capital. The Pathfinder's illustrated weekly review gives you a clear, impartial and correct diagnosis of public affairs during these strenuous, epoch-making days.

The little matter of **15c** in stamps or coin will bring you the Pathfinder **13** weeks on trial. The Pathfinder is an illustrated weekly, published at the Nation's center, for the Nation; a paper that prints all the news of the world and tells the truth and only the truth; now in its 24th year. This paper fills the bill without emptying the purse; it costs but $1 a year. If you want to keep posted on what is going on in the world at the least expense of time or money, this is your means. If you want a paper in your home which is sincere, reliable, entertaining, wholesome, the Pathfinder is yours. If you would appreciate a paper which puts everything clearly, fairly, briefly—here it is. A dollar bill mailed at our risk will bring you the Pathfinder for a full year, or simply send **15c** to show that you might like such a paper and we will send the Pathfinder on probation **13** weeks. The 15c does not regret us, but we are glad to invest in new friends.

PATHFINDER, Box 33, Washington, D. C.

Non-Fluctuating 6% Bonds

THOUSANDS of investors, who have seen their holdings of standard listed securities shrink in value as a result of the war, are turning today to non-fluctuating investments, such as first mortgage serial bonds, safeguarded under the *Straus Plan*.

These bonds are always worth par and accrued interest, 100 cents on the dollar, in any and all conditions. They are safe, they yield 6% and they are issued in $1000 and $500 amounts. Write today for

Circular No. I-708

S.W. STRAUS & CO.

Founded 1882 Incorporated 1905

NEW YORK 150 Broadway
CHICAGO Straus Building

Branch Offices:

Detroit Minneapolis Cincinnati San Francisco
Kansas City Dayton Philadelphia

35 years without loss to any investor

The economic progress of the South in the past ten years has been more rapid than in any other section of the country

"The Seaboard"

The lines of The Seaboard Air Line Railroad extend through the most thriving and progressive parts of the South. It is keeping abreast of the growth of its territory. To show the progress of The Seaboard we have prepared a pamphlet dealing with—

Growth of Earning Power—
Maintenance of Property—
Financial History—
Management, etc.

A copy of this booklet, AN-61, will be furnished on request

The National City Company

National City Bank Building
New York

What Protective Buying Means To The Investor

PROTECTIVE BUYING is the scientific, efficient purchasing of dependable investment securities by an established financial house before offering them to its clients. It is as essential to the success of a financial organization as honest production is to the success of a great manufacturing concern.

Protective buying, in all its ramifications, has been pioneered by the William R. Compton Company. Purchasers of our securities appreciate its manifold advantages.

Seven million dollars' worth of choice Municipal Bonds always on hand in $1,000, $500 and $100 amounts. Four to five and one-eighth per cent interest. All free from the Federal Income Tax. Complimentary copy of "The Premier Investment" booklet (edition N9) sent on request.

William R. Compton Company

Municipal Bonds

"Over a Quarter Century in This Business"

NEW YORK 14 Wall Street
ST. LOUIS 408 Olive Street
CHICAGO 105 So. La Salle Street
CINCINNATI 102 Union Trust Bldg.
PITTSBURGH: 721 Farmers Bank Building

ESTABLISHED 1865

Guaranteed First Mortgage Bonds

Netting 7%

Denominations, $500 and $1,000, maturing in five years.

Secured by real estate improved with new residences and apartment buildings.

Value of security over twice entire loan.

Payment of principal and interest guaranteed by a widely known corporation with large established earnings.

Strongly recommended by us.

Send for Circular No. 997 D

Peabody, Houghteling & Co.

(ESTABLISHED 1865)

10 South La Salle Street, Chicago

(A 516)

ESTABLISHED 1865

"Mention the Geographic—It identifies you."

Directions for Washing White Corduroy

1. Wash in warm soapy water (Ivory Soap) until clean.
2. Boil one-half hour in soapy water (Ivory Soap).
3. Rinse in warm clean water; change water three times.
4. Rinse in cold blueing water.
5. Don't wring or squeeze.
6. Hang to drip dry, (in open air if possible).
7. Don't iron.
8. Unless the above directions are strictly followed you will not get satisfactory results.

IVORY SOAP

IVORY
IT FLOATS

99 44/100 % PURE

CORDUROY and other fabrics which, at first glance, seem to require for their cleaning something other than soap and water, can be washed as easily and successfully as any so-called "washable" material if one is particular to use Ivory Soap.

Ivory Soap makes so great a difference in soap and water washing because it is free from the injurious ingredients that make ordinary soap unsafe for many things. By introducing into laundry work a cleanser that is mild, white, pure and as harmless as water itself, Ivory Soap makes safe the washing of almost everything.

VOL. XXXII, No. 3 WASHINGTON SEPTEMBER, 1917

THE NATIONAL GEOGRAPHIC MAGAZINE

THE FOOD ARMIES OF LIBERTY

By HERBERT HOOVER

That the great world war will be won at last on the battlefield of food becomes increasingly evident as the months go by. And that is a battlefield where the highest and the lowest, the youngest and the oldest, the weakest and the strongest, may do equally valiant service in the cause of our country. Herbert Hoover, the man who saved Belgium from starvation, is now, as National Food Administrator, the general-in-chief of the food armies of Liberty. In two momentous addresses recently delivered, he has strikingly pointed out how we may be soldiers in the American food army, how we will help the cause of Liberty by enlisting, and the dark consequences that may ensue unless we do enlist. They constitute a new drum-beat to duty; they sound a new note on the great subject of individual responsibility. The NATIONAL GEOGRAPHIC MAGAZINE, *seeking to send the message to the uttermost reaches of the country, publishes these addresses in full in this and the succeeding article. It hopes every member of the Society will join the movement to make the food army of America 100,000,000 strong.*

I HAVE been asked to review the reasons why we are pleading with the American people for stimulation of our food production, for care, thought, and economy in consumption, and elimination of waste. Further, I wish to review the methods by which these things may be accomplished.

Briefly, the reasons are simple. Our Allies are dependent upon us for food, and for quantities larger than we have ever before exported. They are the first line of our defense; and our money, and ships, and life blood, and, not least, our food supply, must be of a common stock.

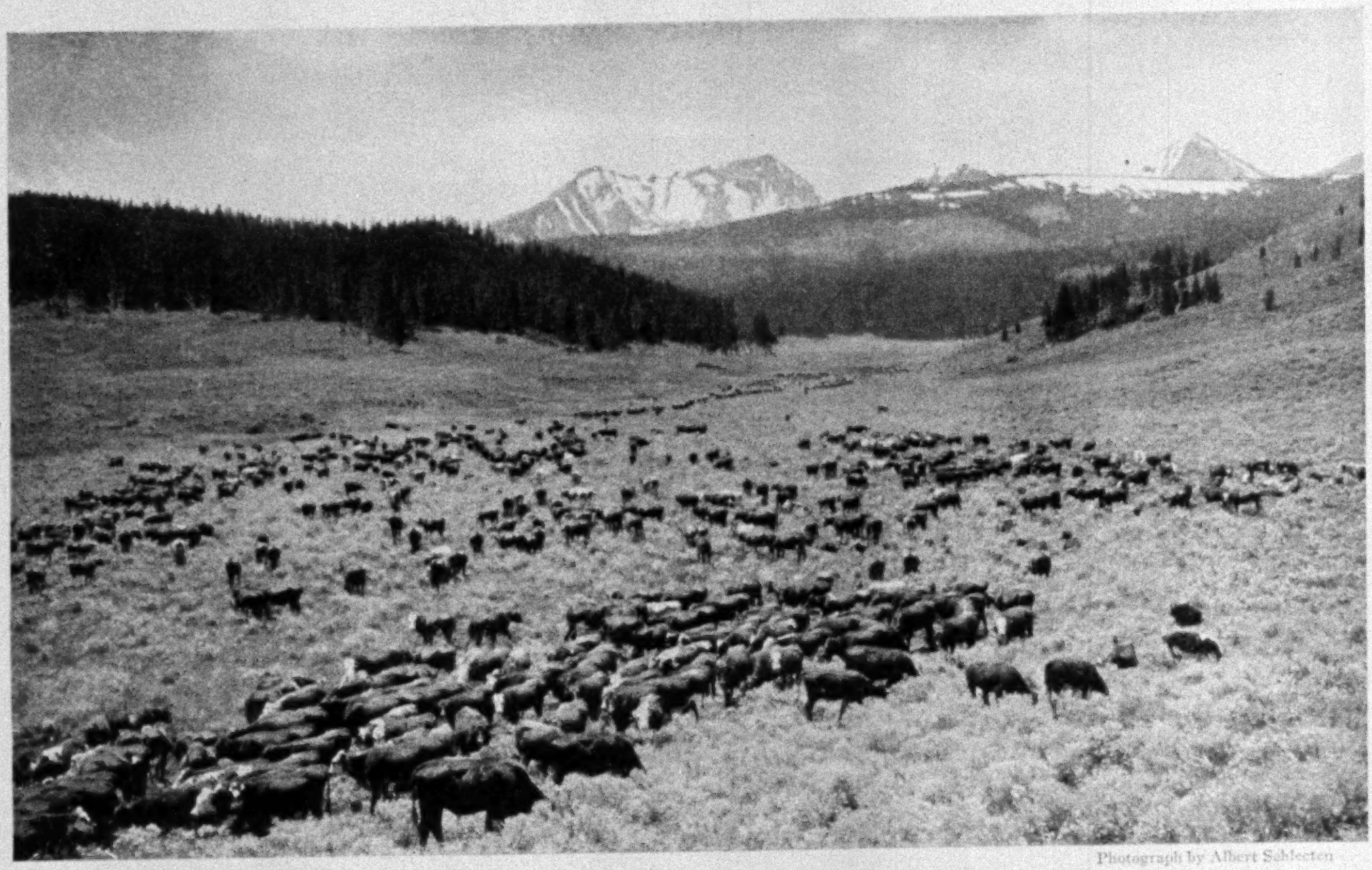
If we cannot maintain our Allies in their necessities, we cannot expect them to remain constant in war. If their food fails, we shall be left alone in the fight, and the western line will move to the Atlantic seaboard.

It is thus a matter of our own safety and self-interest. It is more than this, it is a matter of humanity, that we give of our abundance that we relieve suffering.

It is not difficult to demonstrate their needs, the volume of our obligation, and the necessity of great effort on our part. In normal pre-war times, England, Ireland, France, Italy, and Belgium were to a large degree dependent upon imports for their food supplies. They yearly imported over 750,000,000 bushels of grain, together with vast quantities of animal and fat products. Belligerent lines have cut off their supplies from Russia, Bulgaria, and Roumania, and the demands of Germany on surrounding neutrals have reduced the supplies from those quarters.

DISTANT GRANARIES MADE INACCESSIBLE

Of more importance, however, is that the submarine destruction of shipping has necessitated that the farthest distant mar-



Photograph by Albert Sahlecten

A RANCH IN MONTANA

America's problem is not one of famine, for we have now, and will have next year, a large surplus. Our problem is, after the protection of our own people, to have available a surplus large enough for our Allies' needs. Beef is one of the concentrated foods which can be shipped abroad in a way to utilize to the best advantage the available ocean-cargo space.

kets should be wholly or partially abandoned. The great markets of Australia and the Indias are now only partially accessible, and gradually the more remote markets will be more and more restricted until a year from now, when our own new ships will be in numbers to help.

The last harvest in Argentina was a failure, and until the next harvest, even that contribution to their supplies is cut off. Beyond this again, much food is lost at sea; perhaps ten per cent of the actual shipments are sunk en route.

Therefore, the load of even normal imports is thrown upon North America—the nearest and safest route.

Of no less concern than the dislocation of markets and the losses at sea is the decrease in production among the Allies. If forty million men are taken out of productive labor and put into war and war work, there can be only one result, and that is diminution in production of food.

Further contributing causes to this diminution are the lessening in the amount of fertilizer which is available, through shortage of shipping and losses at sea, and the consequent reduction in the productivity of the soil itself. This year the decrease in production stands out in more vivid silhouette than ever before.

We have had a stock-taking by the various food administrators and departments of agriculture in Europe, and they find that the production of cereals this year has diminished about 525,000,000 bushels of grain below normal. This shortage in production, added to normal imports, gives 1,250,000,000 bushels of grain that must be imported by the Allies during the next twelve months, if consumption is kept normal.

Their cattle, sheep, and hogs have diminished by over 30,000,000 animals, and these reductions are bound to go on with increasing velocity, because short supplies have necessitated eating into the herd.

A BURDEN WE MUST CARRY

How great the burden upon the United States is may be made clear by a few figures: During the three-year pre-war period we averaged an annual export of 120,000,000 bushels of grain and 500,000,000 pounds of animal products and fats. During the last fiscal year we exported over 400,000,000 bushels of grain and 1,500,000,000 pounds of animal products and fats. (See also page 197.)

During this period we really over-exported—we, ourselves, are selling our animals faster than we grow them, and our stock of foodstuffs just prior to harvest was relatively the lowest in our history.

As the causes of Europe's shortage grow in intensity, our load this next year must be of much greater weight.

As our harvests and those of our Allies are now measurable, we now know the size of the world's larder for the coming winter, and it will measure insufficient unless we can reduce our consumption and waste.

Our Allies are making every possible effort to reduce consumption and eliminate waste. Most of the principal staples are dealt out to the public under one kind or another of a restriction. *Fines up to* $500 *are levied on persons who throw away stale bread.* But despite all these efforts, there is not such a reduction in national consumption as one might expect.

Besides the men in the trenches and the men working ten to eleven hours daily in the shops, millions of women have been drawn into physical labor, and all of these require more food than they required under normal conditions in pre-war times.

The result is that while the saving in food is appreciable, it is not as much as one would expect.

There is one feature of all these efforts toward conservation in Europe that stands out vividly—the non-working population is in large part composed of the old, the women, and the children; they are the class upon which the incidence of reduction largely falls. The people in war work are in national defense, and they must have the first call on all supplies. Therefore, any failure on our part in supplying food will fall upon the class to whom our natural sympathies must be the greatest. But there is a point below which it cannot fall and tranquillity be maintained.

We have a general limitation on our food supplies to the Allies, and that is

Photograph from Food Administration

WHEAT READY FOR SHIPMENT TO EUROPE: SAVING YOUR SLICE A DAY MAKES THIS POSSIBLE (SEE PAGE 195)

"To save is to serve" is a motto of the far-sighted group of men and women who are members of the Food Administration. Their aim is to live wisely, but not too well; to eat freely, but to avoid waste; to eat principally fruits and vegetables grown near home, potatoes, corn, etc., which are equally nutritious, thus saving wheat, beef, pork, and sugar for shipment to our Allies.

that the condition of shipping requires that all the foodstuffs sent shall be of the most concentrated sort. Therefore, the commodities which we have to send are most advantageously limited to wheat, corn, beef, pork products, dairy products, and sugar.

If we consider our own supplies, we find that we have enough of corn. We have a great surplus of potatoes, vegetables, fish, and poultry. These latter commodities do not lend themselves to shipment either from bulk or other reasons. We cannot increase, or even maintain, our present exports of wheat, beef, pork, dairy products, and sugar without reducing our consumption.

WE MUST EAT THE KIND OF FOOD THAT CANNOT BE EXPORTED

The logical and sensible first step in adapting our supplies to Allied needs is *to substitute on our own tables corn, potatoes, vegetables, fish, and poultry for those staples we wish to export.* The proportion of our national diet in vegetables is very low, and it will not only do no harm to increase it, but in fact will contribute to public health.

Space does not permit that I should give you the position here of each staple in the national and international situation. I may, however, describe briefly one or two of them.

We of the United States normally raise for export about 80,000,000 bushels of wheat. Canada produces something like 100,000,000 bushels of wheat for export. Europe must import this year 525,000,000 bushels of wheat if they are to maintain their normal bread supply. (See page 189.) With our normal export of 80,000,000 bushels, we can go but a short distance toward accomplishing that end. If, however, by conservation we increase our export to 200,000,000 bushels and Canada increased hers to 125,000,000 we shall then come within 200,000,000 bushels of the solution of the problem.

By conservation and by substituting 20 to 25 per cent of other cereals in Europe's war bread and by some imports from far-distant markets, the problem may be solved, but the margin is so narrow that any failure on our part to provide an extra 120,000,000 bushels of wheat risks disaster to the whole cause.

For us to increase exports of wheat from 80,000,000 bushels to 200,000,000 bushels means that we must make a saving of about 20 per cent in our wheat consumption. That is not a great burden for our people to bear.

EUROPEANS HAVE NOT LEARNED TO EAT CORN

This means an average saving of one pound of flour per person per week out of their five pounds' consumption, and it is not asking much of our people that they should substitute other cereals to that extent.

Now a number of inquiries arise with reference to different phases of this question, and one is why Europe does not take the corn instead of the wheat?

For one hundred years the wheat loaf has been the basis of life in Europe, with the exception of Italy. The art of household baking has long since been lost. Most of the bread is baked by bakers. For this reason alone it is almost impossible for our Allies to substitute corn bread, which cannot be distributed by bakers. Furthermore, the actual household machinery of baking—ovens, etc.—, has long since been out of existence in most European homes.

Furthermore, if we are to ship corn, we must ship it in the form of the grain itself, for cornmeal does not keep well, and European countries have but little facilities for milling the corn. They are mixing cornmeal in the wheat flour; but there is a limit beyond which cereals cannot be mixed in the wheat loaf and have the bread rise, and that limit is somewhere about 25 or 30 per cent. They are using higher milled wheat than we for economy's sake, and mixing it with other cereals. It makes war bread far less palatable than our corn bread.

WE USE FOUR TIMES AS MUCH SUGAR AS OUR ALLIES

Another case in point is sugar. We import between one-half and two-thirds of our sugar from the West Indies. The Allies formerly drew sugar from Russia, Germany, Austria, and Java. They are now compelled to bring their demands to

Photograph from M. L. Alexander

HARVESTING THE RICE CROP AT CROWLEY, LOUISIANA

Rice, corn, rye, and buckwheat are the grains which America has in abundance, and their use as substitutes for wheat is being encouraged in every manner possible by the food conservationists. Louisiana has over 400,000 acres of land devoted to rice cultivation and it is, with sugar and corn, one of the three great staples of the State, being worth about ten million dollars a year.

our market, and, therefore, we must reduce our consumption if we are to leave enough for them.

We consume from 85 to 90 pounds per person per annum. The Allies have placed their population on a sugar ration of from 21 to 25 pounds per person. Even this cannot be supplied without reduction on our part, and France has asked us to export them 100,000 tons of our supplies at once; otherwise they must stop the ration altogether. That we should refuse France is unthinkable.

Besides substitution the other great need is to save waste—the gospel of less buying, serving smaller portions, the clean plate, to use our food wisely in economy. There are a hundred avenues of saving—if we inspect the garbage can.

Again, there are commodities in which we must reduce consumption. If we are to supply the Allies and ourselves both with sugar and fats over the next winter, we simply must reduce the consumption. By fats we mean lard, bacon, butter, cream, lard substitutes, and soap. We consume nearly double the amount of fats that we need and we waste a fabulous amount.

There are other features of food conservation of national importance. One of them lies in the whole problem of national saving. Wars are paid for out of the savings of a people. Whether we meet that expenditure now or after the war, we will have to pay it some day from our savings.

The savings of a people lie in the conservation of commodities and the savings of productive labor. If we can reduce the consumption of the necessary commodities in this country to a point where our laborers can turn to the production of war materials; if we can secure that balance and get to the point where we can free our men for the army, we shall have solved one of the most important economic problems of the war.

If we are to carry on this war and carry it on without economic danger, we must carry a major portion of it now during the war from the savings which we make at the present time. If we reduce the waste and the unnecessary consumption of food by a matter of only six cents a day, we shall have saved two billions per year.

Conservation has other bearings as well. There are the great moral questions of temperance, self-denial, and self-sacrifice. We have been a most extravagant and wasteful people, and it is as truly intemperance to waste food as it is to take unnecessary drink.

Next year, in order to maintain our Allies in war, we must make even further efforts to increase the export over last year, and it is obvious that we not only cannot do so without conservation, but that unless we do have conservation we must expect higher prices.

It is often said that high prices are themselves a conservation measure, but they are a conservation measure of the nature of famine. It is conservation in favor of the rich and against the poor. The rich will have all the food and variety they need, but the poor must, under this form of conservation, shorten their food allowance and diminish their standard of living.

The only real conservation is one by which the whole population, rich and poor alike, take their part in the provision of these necessary supplies.

This can only come about either by forced measures from the government, by which all are placed on ration and the available foodstuffs equally divided, or alternatively, by a great voluntary effort of self-denial by which the added supply can be obtained without vicious action or conservation through price.

A CALL TO PLAIN LIVING IN EVERY HOME

Another bearing of the problem lies in that we have had growing in this country a class of the population given over to more or less idleness and a great deal of extravagance. There grows out of this a certain amount of class feeling, in a country where there should be no class division. There is now an opportunity for that class, by a reduction in its scale of living, to demonstrate its fidelity to the national cause and its willingness to share its full portion of the national burden. In so doing that section of our people will have demonstrated something more than mere saving—it will have demon-

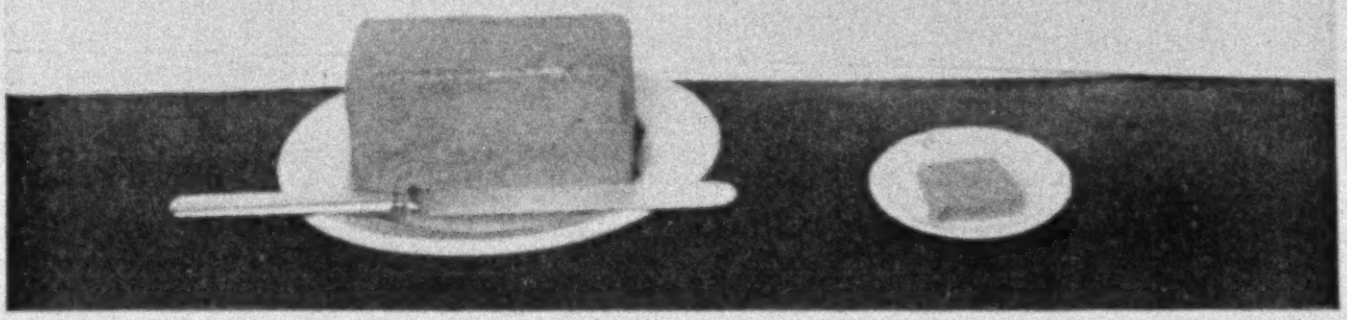
SAVE BUTTER

by not serving too much to each person

SERVE INDIVIDUAL PORTIONS.

A pound makes 48 one-third ounce pieces.

Hotels Have Learned
that there is the least waste
from one-third ounce pieces



Photograph from Food Administration

ONE OF THE GREAT STAPLES TO BE CONSERVED

The Food Administration has many activities, but only one purpose: to lead the American people to save concentrated foods, like wheat, beef, pork, sugar, and dairy products, by substituting more plentiful articles of equal nutritive value. Our duty is to send as much concentrated food as possible to our Allies this winter, utilizing every cubic foot of available ocean-shipping space to the best advantage.

strated a willingness to serve in our national necessity, even to the matter of personal sacrifice.

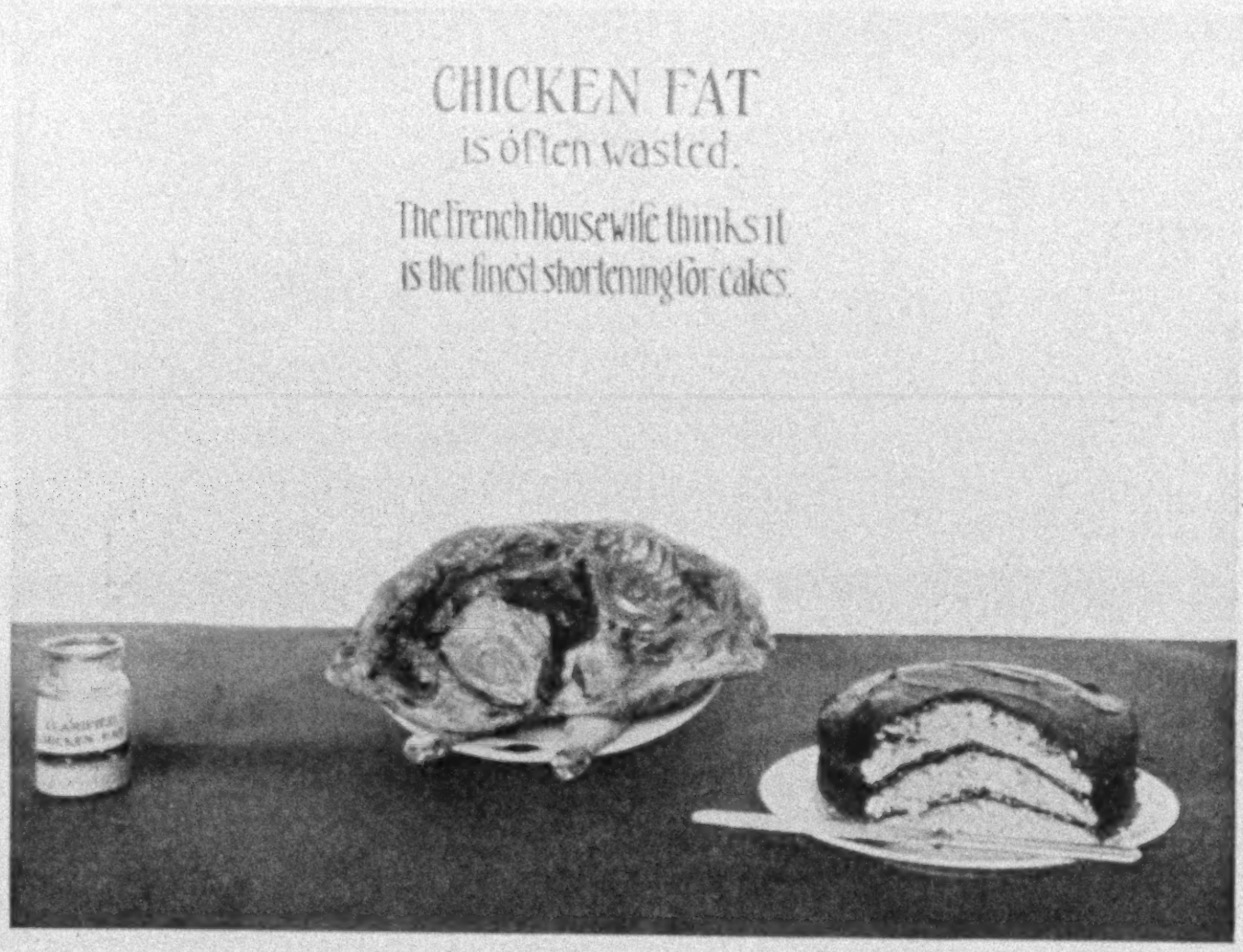
There is a phase of this entire work which has appealed greatly to us here, and that is the whole question of national service. Here is an opportunity for every man, woman, and child in this country to contribute immediately and directly to the winning of the war. It should be possible to show to the entire population that there is at least one point in which all may serve in this struggle. There should result not only saving, but the sense of service, a sense of contribution to the war itself, and a proof of loyalty and support in each and every individual.

There is no force by which conservation could be imposed upon the American people. Conservation can be accomplished in some countries by iron-clad law, or by forcing legal limitations on every individual in the country, but in our country that is not only unfeasible from the governmental point of view, but it is against the instincts of the people.

A NATION OF VOLUNTEERS NEEDED

We may accomplish the same result voluntarily if we can give the people a stimulus in the knowledge that every individual has here a definite service to perform.

We have, therefore, never considered this problem from the viewpoint of force,



Photograph from Food Administration

CAKE WITHOUT BUTTER; CHICKEN USED INSTEAD

All over this country there is being waged a campaign of visualized publicity to promote the conservation of food through substitution. This is done through the medium of window displays in cooperation with hundreds of mercantile associations. These displays of the comparative nutritive value of various foods are governed by the briefly defined policy of the Food Administration, that our national problem is to feed our Allies by sending them as much food as we can of the most concentrated nutritive value.

we have considered it always from the viewpoint of voluntary effort. We have asked all to join us as voluntary workers, as we are to effect by a democratic movement the results which autocracy has only been able to effect by law and organization. Indeed, we feel there is a service here greater than the actual saving and the actual practical result. There is the possibility of demonstrating that democracy can organize itself without the necessity of autocratic direction and control.

If it should be proved that we cannot secure a saving in our foodstuffs by voluntary effort, and that as a result of our failure to our country we are jeopardizing the success of the whole civilized world in this war, it might be necessary for us to adopt such measures as would force this issue, but if we come to that unhappy measure we shall be compelled to acknowledge that democracy cannot defend itself without compulsion—which is autocracy and is a confession of failure of our political faith.

If we can secure allegiance to this national service in our 20,000,000 kitchens, our 20,000,000 breakfast, lunch, and dinner tables; if we can multiply an ounce of sugar, or fats, or what-not per day by 100,000,000 people, we have saved 180,000,000 pounds in a month. If we save a pound of flour per week, we save 125,000,000 bushels of wheat per annum.

It is this multiplication of minute quantities—teaspoonfuls, slices, scraps—by 100,000,000 and 365 days that will save the world. Is there any one in this land who cannot deny himself or herself something? Who cannot prevent some waste? Is not your right to life and freedom worth this service?

Photograph by Peter Henderson & Company

IRISH COBBLER POTATOES GROWN IN MAINE

Potatoes, beans, turnips, peas, cabbages and other vegetables, with fish and poultry, are the *pieces de resistance* especially recommended by the Food Administration. This year there has been a bumper potato crop and the high prices of last year are not likely to recur. Potato flour is being widely used in the making of cakes and puddings, and also to some extent with wheat flour, in the making of bread and rolls.

THE WEAPON OF FOOD

By Herbert Hoover

FOOD has gradually, since the war began, assumed a larger place in the economics, the statesmanship, and the strategy of the war until it is my belief that food will win this war—starvation or sufficiency will in the end determine the victor.

The Allies are blockading the food from Germany; and the surrounding neutrals are under pressure to export their surplus both ways and to reduce their imports. The Germans are endeavoring to starve the Allies by sinking the food ships. Short production and limitation of markets cumulate to under-supply, and all governments are faced with reduction of consumption, stimulation of production, control of prices and readjustment of wages. The winning of the war is largely a problem of who can organize *this weapon*—food.

THE ZONE OF SUPPLY GRADUALLY NARROWING

As to our more intimate problems, to effect this end, it must be obvious that the diversion of millions of men to war reduces the productive labor of the Allies, and in consequence the food production. Also the destruction of food at sea, and of still more importance, the continuous destruction of shipping, has necessitated the gradual retreat in area from which overseas food supplies can be obtained to any given country.

Thus there has grown not only a limitation of supplies, but an accumulation in inaccessible markets. The result of these cumulative forces is that North America is called upon, by both Allies and neutrals, for quantities of food far beyond its normal export ability.

What this tax upon our resources amounts to is evident enough from the fact that during the past fiscal year we have increased our grain exports from 120,000,000 bushels—the three-year, pre-war average—to 405,000,000 bushels. This year the Allied production is reduced by 300,000,000 bushels over last year, and we must therefore meet a much larger demand. Our exports of meat and fat products have increased from pre-war average of 500,000,000 pounds to 1,500,000,000 pounds for the last fiscal year. And owing to the decrease in their animal herds, the Allies will require still more next year (see page 189).

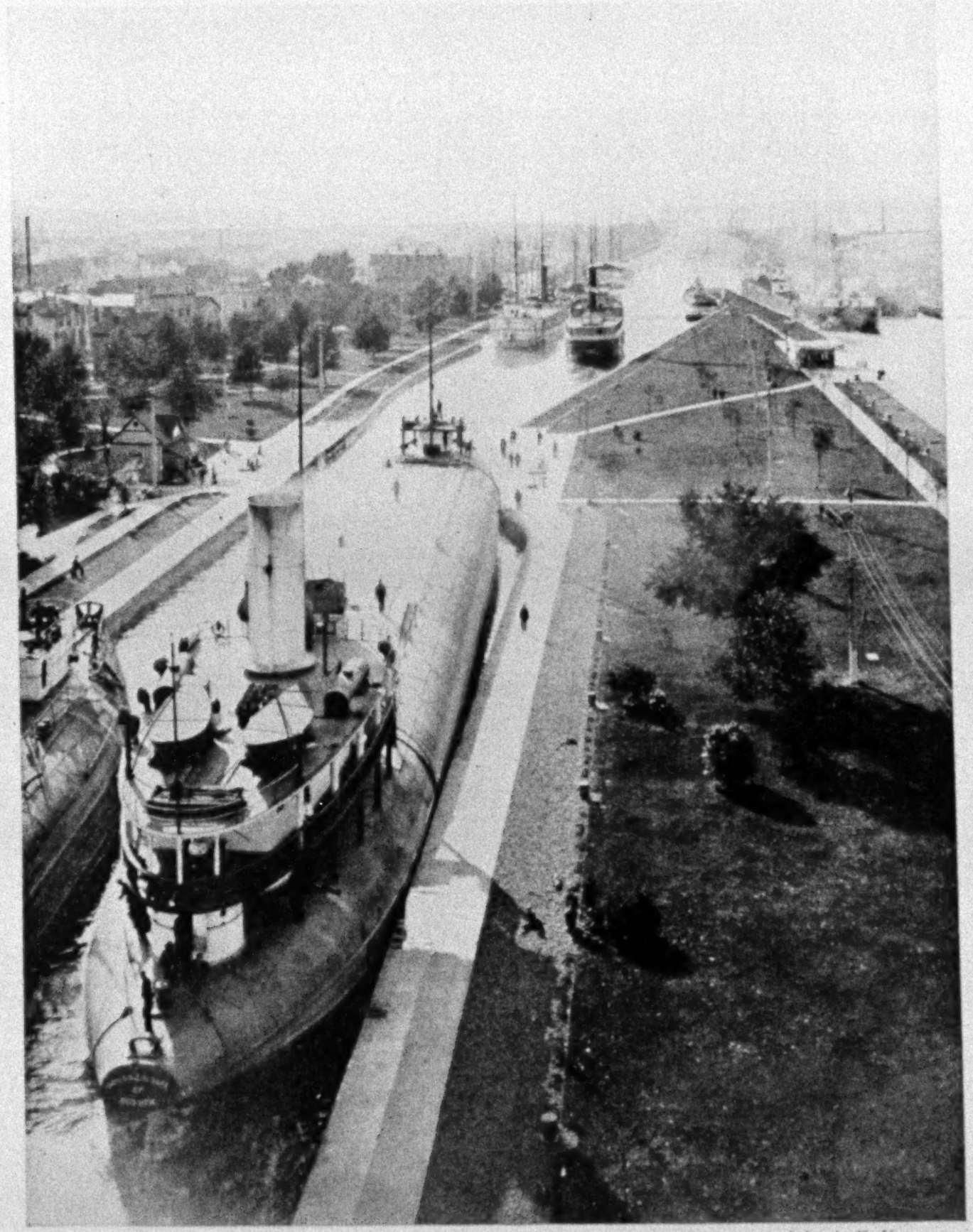
PRODUCTION MUST BE QUICKENED AS WELL AS CONSUMPTION CUT DOWN

If the extremely high prices thundering at every door were not a sufficient demonstration, it is possible, by actual figures, to prove that we have been exporting many commodities actually beyond our capacity to produce. Taking the three-year pre-war period as 100, we find in pork, for instance, the number of animals on hand on the 30th of June this year is variously estimated at from 92 to 98. The slaughter of animals during the year was at the rate of 179; the exports were at the rate of 215, and the natural consequence is that the price is at 250.

During the past year we have exported every last ounce of which the country during this period was capable of producing, and our national stock of cereals and animal products, proportionate to our population, was at the beginning of this harvest the lowest in our history, and many of us have been under the keenest anxiety lest we would face absolute shortage. This anxious period is now happily passed.

The demand in many commodities during the coming year is beyond our capacity to furnish if we consume our normal amounts. The necessity of maintenance of the Allies as our first line of defense and our duty to humanity in feeding the neutrals demand of us that we reduce our every unnecessary consumption and every waste to the last degree—and even then the world dependent on us must face privation. (See also pages 187 and 189.)

Owing to the limitation of shipping, we must confine our exports to the most con-



Photograph by A. E. Young

WHALEBACKS LOADED WITH WHEAT IN THE LOCKS AT SAULT STE. MARIE

On September 1 the exportable reserve of wheat in Australia was estimated to be 135,927,000 bushels; in India, 80,538,000 bushels; in Argentina, 26,107,000 bushels, and these reserves will be materially increased by the production of the next few months. If these stocks were available for the Allies, the wheat problem of North America would immediately be solved. Australia, however, is three times as far from Europe as is the United States, and therefore three times the tonnage is required to transport an equal quantity. Added to this, the submarine danger is twice as great.

centrated foodstuffs—grain, beef, pork, dairy products, and sugar.

We must control exports in such a manner as to protect the supplies of our own people. Happily we have an excess of some other commodities which cannot be shipped, particularly corn and perishables, and we can do much to increase our various exports if we can secure substitutions of these in the diet of our people; but above all we must eliminate our waste.

Our first duty lies to our Allies, and if they are to sacrifice a share of our food to neutrals, and if this is also the result of our own savings and our own productive labor, these neutrals should expect to furnish equivalent service in other directions to the common pool against Germany.

Populations short of food hesitate at no price, and in those commodities where there is demand beyond supply, whether food or otherwise, the old law of price-fixing by "supply and demand" is broken.

SPECULATION ENGENDERED BY OVER-DEMAND

Such an over-demand gives opportunity for vicious speculation and presents an instability to trade which necessitates widening margins in distributing profits and great damage to the consumer. It results in marking up the prices of millions of articles upon the shelves and engages the whole of the distributing trades in inherent speculation.

It is upon this question of price that I wish to dwell for a moment.

We have all listened to the specious arguments of the siren of high prices: it is heralded as the mark of prosperity and to possess economic advantages; it is advocated as a conservation measure. It is true, high prices reduce consumption, but they reduce it through the methods of famine, for the burden is thrown on to the class of the most limited means, and thus the class least able to bear it.

There is no national conservation in robbing our working classes of the ability to buy food. High prices are conservation by reducing the standard of living of the majority. It works no hardship on the rich and discriminates against the poor.

Real conservation lies in the equitable distribution of the least necessary amount, and in this country we can only hope to obtain it as a voluntary service, voluntary self-denial, and voluntary reduction of waste by each and every man, woman, and child according to his own abilities; not alone a contribution of food to our Allies, but a contribution to lower prices.

We have and will retain sufficient food for all our people. There is no economic reason why there should be exorbitant prices. We are not in famine. It is obvious that our people must have quantities of food and must have them at prices which they can pay from their wages.

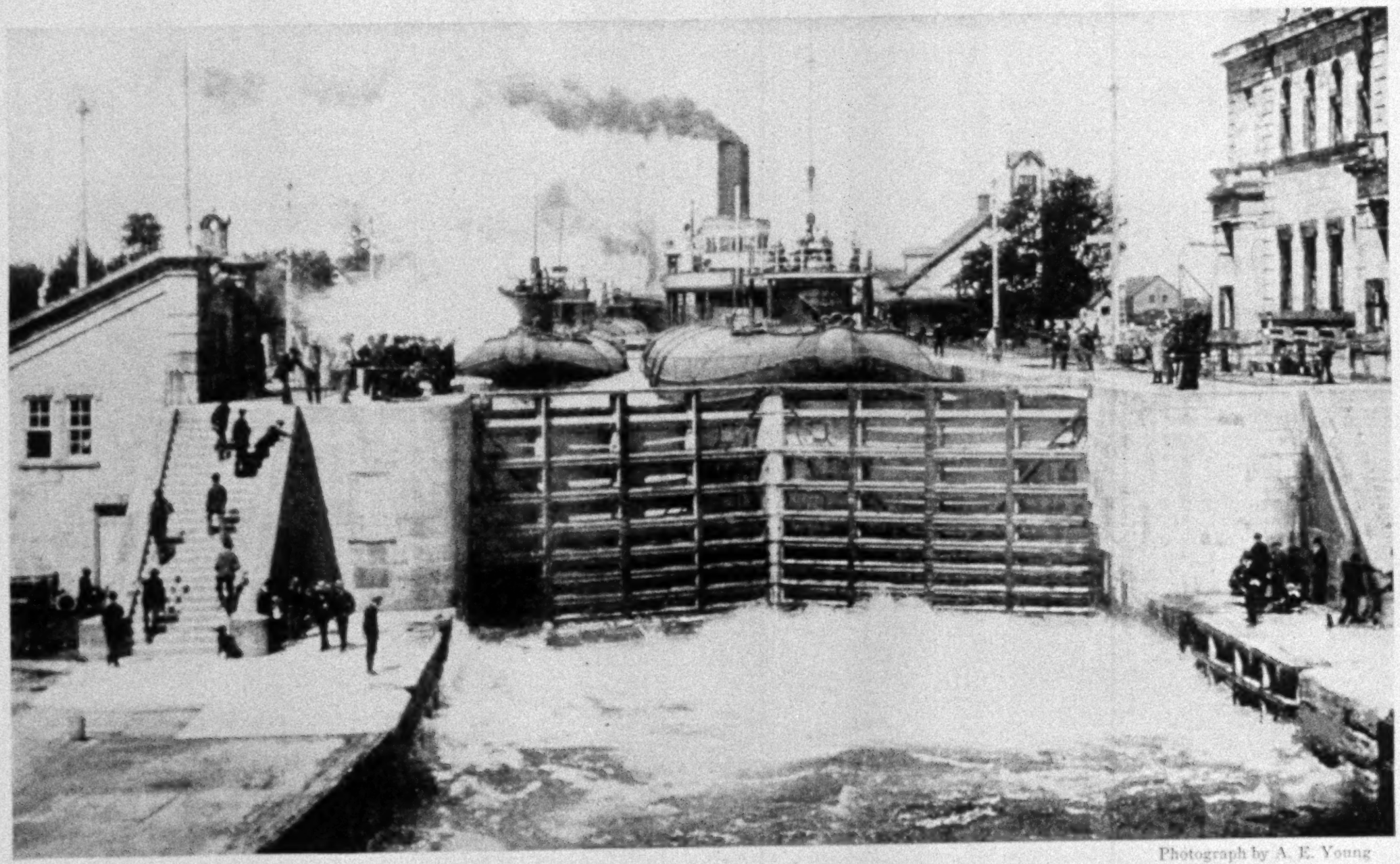
HIGH PRICES LEAD TO STRIKES, DISORDERS, RIOTS, AND UNDERMINE NATIONAL EFFICIENCY

If we are to have ascending prices, we must have ascending wages. But as the wage level rises with inequality, it is the door leading to strikes, disorder, riots, and defeat of our national efficiency. We are thus between two fires—to control prices or to readjust the income of the whole community. The verdict of the whole of the world's experience is in favor of price control as the lesser evil.

There are few who will dispute the advantage of such regulation as will eliminate speculation and extortionate profits. This is difficult to disassociate from fixing of prices, yet a great deal may be done by simple regulation and the organization of trades to police themselves under government patronage—to put regulations into force as will protect the legitimate and patriotic trader—for no one will deny that speculation against the consumer is a vicious crime in our present state.

The large question of the hour is price-fixing, because the suspension of the law of demand and supply as an equitable economic law is forcing our hand in every direction.

The total experience of Europe has demonstrated that many methods of price control, such as maximums and minimums, are a fallacy, and in themselves stimulate evasions and generate economic currents, which, while they may be a temporary palliative to a situation,



Photograph by A. E. Young

WHEAT WHALEBACKS LOWERING IN THE LOCKS FROM LAKE SUPERIOR TO LAKE HURON

Europe insists upon wheat for bread, for her peoples do not understand the value of corn as food (see page 191). As a matter of fact, there is more nutritive value in a dollar's worth of corn meal than in a dollar's worth of wheat flour. Italy is the only European nation which accepts corn as a proper foodstuff. There are four bushels of corn raised in America to one of wheat, and if corn were used here as a substitute for wheat, enough of the latter would be released to make up the European deficit.

Photograph from Food Administration

WASHINGTON FIREMAN CANNING HIS CORN CROP

Many of the fire-fighters in the nation's capital did their bit this past summer by raising produce on vacant lots adjacent to the fire stations. This patriotic fireman harvested his crop and carried it to the nearest community canning center, where he donned a gingham apron, rolled up his sleeves, and "put up" his winter's stock of this delectable food.

ultimately wash away the very foundations of production and distribution.

Of European experience in price-fixing practically but one formula has remained, and that is the fixed specified price for every stage of a given commodity, from its raw to its finished delivered state, based as nearly as may be on the cost of production and reasonable return on capital.

We will find, as we go on with the war and its increasing economic disruption, that first one commodity after another will need be taken into control. We will, however, profit by experience if we lay down no hard and fast rules, but if we deal with every situation on its merits.

So long as demand and supply have free play in a commodity, we had best leave it alone. Our repairs to the break in normal economic control in other commodities must be designed to repair the break, not with a view to setting up new economic systems or theories.

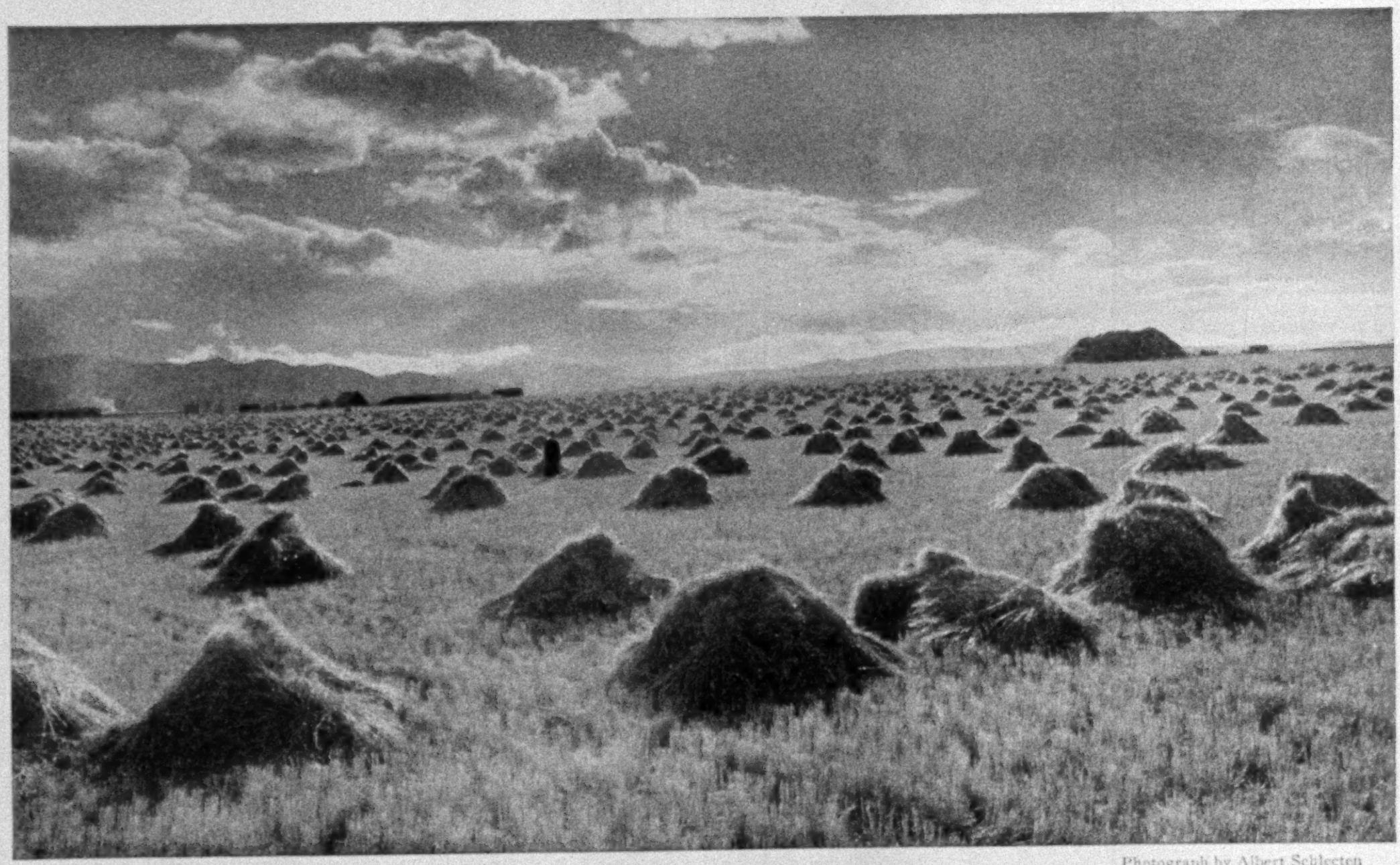
PRICE-FIXING AND PRODUCTION

It appears to me we can divide our commodities roughly into four classes:

First. Those commodities of which we produce our own supply and for which there is no export or import business of such consequence as to influence the whole, such as corn, potatoes, onions, apples, and many others. Here the law of demand and supply still reigns, and we can well leave them alone, provided no person or persons attempt to upset the normal flow of barter, and then we can best deal with the person.

Second. Those commodities the export demand for which dominates the price. Here it is possible as a first step to regulate the export price. In such a class I may mention wheat and flour.

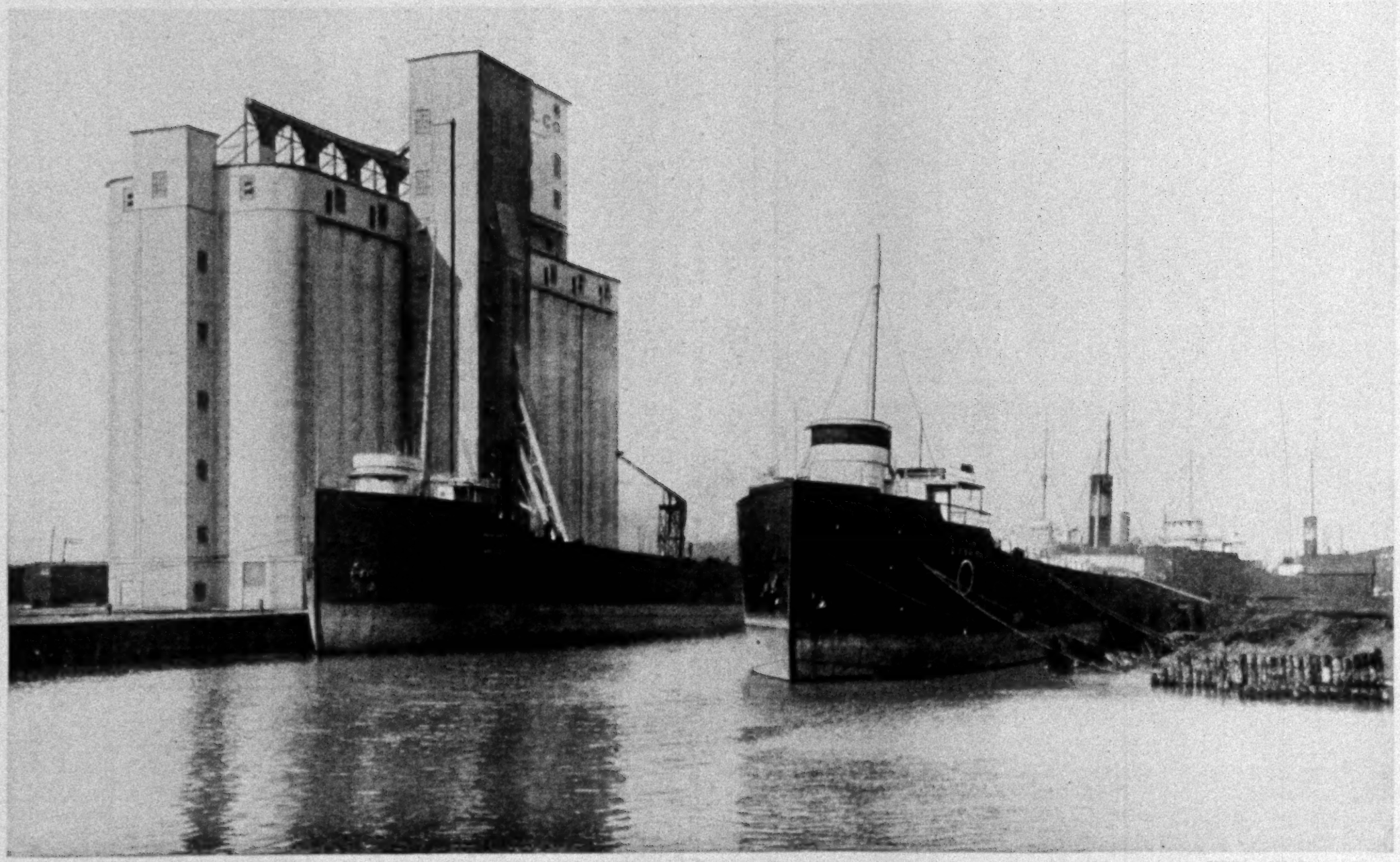
Nor have we much choice as to the matter of these commodities, for under the agreements between our government and the Allies our government must pur-



Photograph by Albert Schlecten

A WHEAT FIELD IN GALLATIN VALLEY, MONTANA

Great Britain normally raises about one-fourth the grain necessary for her bread, and France about one-half. War has greatly changed this situation, besides cutting off much of the imports from Australia and India. The burden of feeding the huge armies and much of the civilian population is thus thrown upon North America (see pp. 189 and 197). In addition to the obvious manner of increasing the supply, which is sowing a greater acreage, the most good can come from reducing the use of wheat to the minimum of necessity, substituting other cereals in the menu wherever possible.



Photograph by William H. Brandel

A HUGE WHEAT ELEVATOR AT BUFFALO, IN WHICH THE GRAIN IS STORED

To unload the vessel, wheat is pumped out through the chute, or "leg," shown in the photograph. Modern elevators eliminate waste and labor in the handling of grain. Bags for a $10,000 wheat crop cost the farmer $500 and add to the freight weight, cause loss through holes, require a large force of handlers, and lead to unfair reductions for the value and weight of the bags. In a ship, sacked grain requires twice as much space as bulk grain.

REMEMBER JACK SPRATT
Why serve the fat to those
who don't care for it
The trimmings saved from six slices
o'ham will shorten this gingerbread

Photograph from Food Administration

"FATS MAY WIN THE WAR"

We are said to consume three times the fats necessary for proper nutrition

chase or direct the purchase of Allied supplies in this country, and as these purchases in many commodities dominate the price, we are face to face with price determination whether we will or not.

Third. Commodities where internal demand exceeds the supply and where direct exports alone do not sufficiently influence the price; and here we are driven to price-fixing at once, to which coal has already fallen.

Fourth. Commodities where our imports control the price. We can in some instances control the volume and price of imports so as to regulate price, and it is obviously in our interest to export as little of our money as we can.

In all control of price, there is one dominant factor. The very need of price control is proof of insufficient production, and in war the necessity itself transcends the cost. Therefore, the constant dominant thought in price must be the stimulation of production.

There is, however, a point at which stimulation is attained. To get ninety per cent of volume of production costs one price, and the need of the commodity to secure each advancing unit of production towards one hundred per cent becomes a problem of balance in the necessity for the commodity against the burden of the consumer.

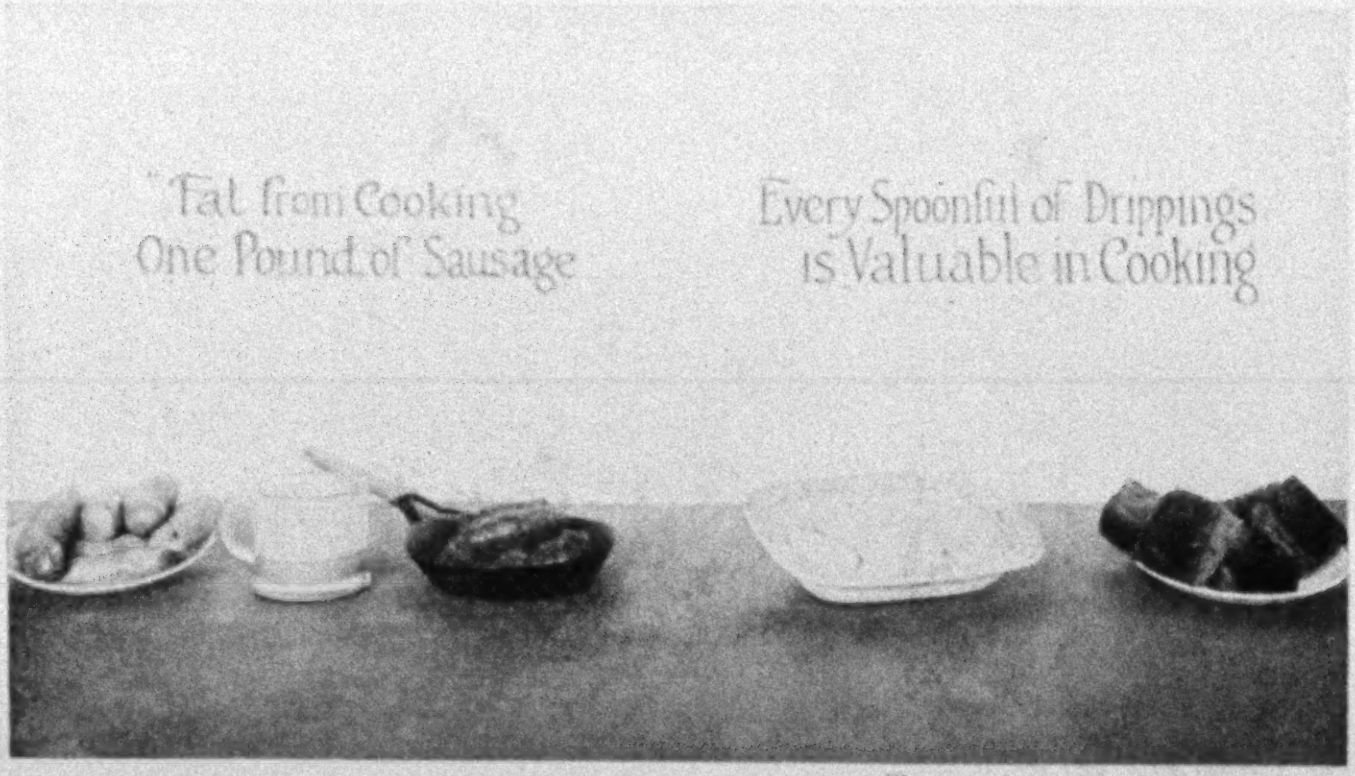
We have in the Food Administration put into action a form of price control through purchase of the exports of wheat and flour. The government must buy or contract the buying of wheat for export and the export volume controls the price. We were immediately confronted with price determination.

FOR THE FIRST TIME IN HISTORY THE FARMER HAD A VOICE IN PRICE-FIXING

To determine it we called in the farmer himself, and gave him the majority of the commission, to determine a fair price.

We gave him the national balance and prayed him to weigh carefully and justly. For the first time in history he had a voice in fixing price, and unanimously determined $2.20 per bushel, with certain differentials on locality and grade.

We then created a voluntary engine of our best commercial men to carry this de-



Photograph from Food Administration

AN OBJECT-LESSON IN THE CONSERVATION OF FATS

"Starvation or sufficiency will in the end determine the victor in this war"

cision into effect, and to eliminate all speculation, and to reduce the cost of distribution, in hopes of finding relief to the consumer. We can now measure the results. The farmer will receive about 60 cents per bushel more for his wheat than his average last year. Sixty cents per bushel is equal to about $3 per barrel in flour. The price of wholesale flour is today $3 per barrel less than the last four months' average.

So here is the measure of reduced speculation and distribution charges—$3 per barrel increase to the farmer and $3 decrease to the consumer.

The Food Administration has no powers to fix prices except through the export buying, the power to buy and sell certain commodities, and the further power to enter voluntary agreements with producers. A case of the latter lies in sugar, where we agree with 95 per cent of the beet producers that they shall fix the price at a certain figure, and we propose to reinforce this by the control of imports, and if necessary to enforce other measures against the five per cent if they fail to fall in with the majority.

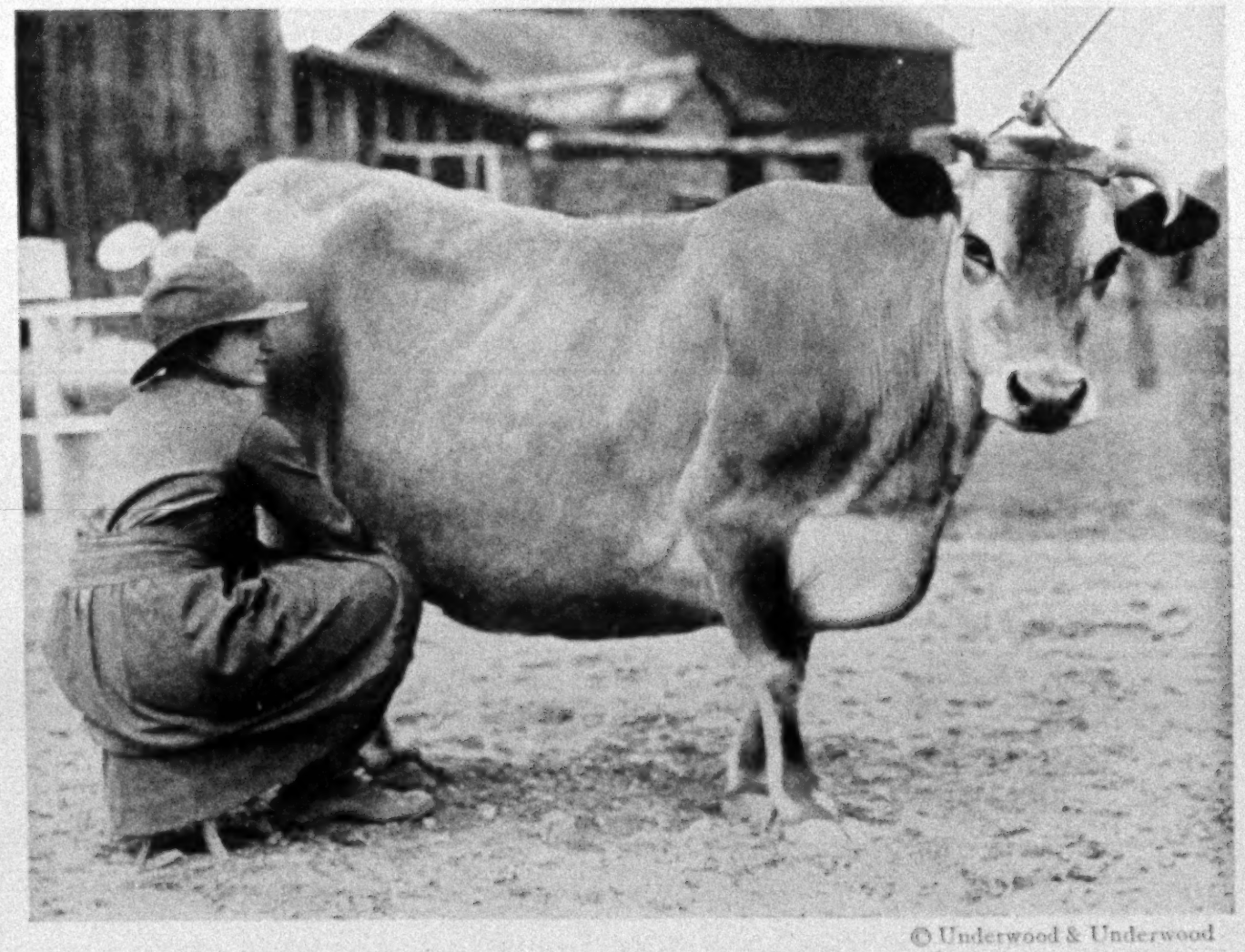
Each and every commodity has its own situation; each must be handled on the merits and with least interference by government that will effect purely war ends, and each by coöperation with the industry itself.

LITTLE POWER OVER PRODUCER AND RETAILER

One illusion in the mind of the public I am anxious to dispel: The Food Administration, through its own authority and the coöperation of other government agencies, can accomplish a great deal, but it is limited absolutely to that area of commerce between the producer and the retailer. We are stopped in law within this area; we can only use influence on both the retailer and producer, and depend upon their patriotism. In this area we can only regulate the flow of trade and hold it to moderate profits and excise speculation. This is an economic step short of price control—except where we can accomplish price control by the indirect means I have quoted above.

In the Food Administration we intend to confine ourselves to ten or twelve fundamental staples—those food commodities that make up the basis of life—we take no interest in the luxuries or even semi-luxuries. We have laid down certain principles of coöperation with the business community, and if we are to succeed on these lines we must have their support.

We are asking the various trades in



© Underwood & Underwood

WHEN THE DÉBUTANTE DESERTS THE BALL-ROOM FOR THE DAIRY

One of the most important fields of endeavor open to women in the present national crisis is the management of farms and dairies. On the New York State School of Agriculture's farm at Farmingdale, L. I., where this picture was taken, girls are taught the most advanced methods of scientific dairy management. The loyalty, diligence, and intelligence of such workers will be of material aid in preventing the price of butter soaring to $1 a pound in the United States, as it has in European countries.

these particular staples to coöperate with us in organization of the trades to the end that all transactions shall be direct in the normal flow of distribution; that speculation shall be excised; that goods shall be sold both by producer and distributor at least at a reasonable and normal charge over cost, or even without profit.

THE PROFITEER A MODERN JUDAS

It appears to us that no right-minded man in this community wants extra profit from the war. If he does he should be branded with the brand of Judas for selling the blood of our sons for profit.

The Food Administration today is directed by a body of 250 volunteer representative business men, producers, and experts, and up to date it has held over 200 conferences with representatives of trades and producers. We have asked them to help in formulating plans to conserve, to stimulate production, and, above all, to regulate distribution. Most have been helpful, and in instances where organization has been completed the devotion of the business men has been above all praise, and in some cases we have so far failed to secure this coöperation in a discouraging way; but I am not, in view of the success in some lines, prepared to say that the experiment is either a success or a failure.

But let no one be under the illusion that selfishness or greed has disappeared from this great republic. There passes over my desk daily a sickening mass of evidence of individual, sectional, and class avarice and self-interest, backed by demand and threat, that is illuminated by rarer instances of real support in the gigantic task of government in this crisis.

We wish for coöperation in service

© Keystone View Co.

THRESHING OATS IN ILLINOIS

Coöperating with the Food Administration are thousands of retail stores located in every part of America. They display cards in their show-windows bearing food-conservation pictures and slogans. One which is being widely used shows four jars containing corn meal, rye flour, oatmeal, and barley and under them the words, "Eat more corn meal, rye flour, oatmeal, and barley—save the wheat for the fighters."

from our commercial community. We wish to stamp our commercial community with the stamp of service in public interest. Compared with the sacrifice of our sons and brothers, it is but little to ask. And it is a service which, if given now, will not be without interest returns for the future. This interest in a thousandfold will come in two directions.

THE LOOMING SHADOWS OF SOCIALISM

If we receive this support, we will have demonstrated the falsity of radical claims as to the necessity of socializing our industries. If we fail we will have given impulse to these demands and ground for their complaints.

One looming shadow of this war is its drift toward socialism, for with the gigantic sacrifice of life the world is demanding a sacrifice of property, and we will surely drift to that rocky coast unless we can prove the economic soundness and willingness to public service of our commercial institutions.

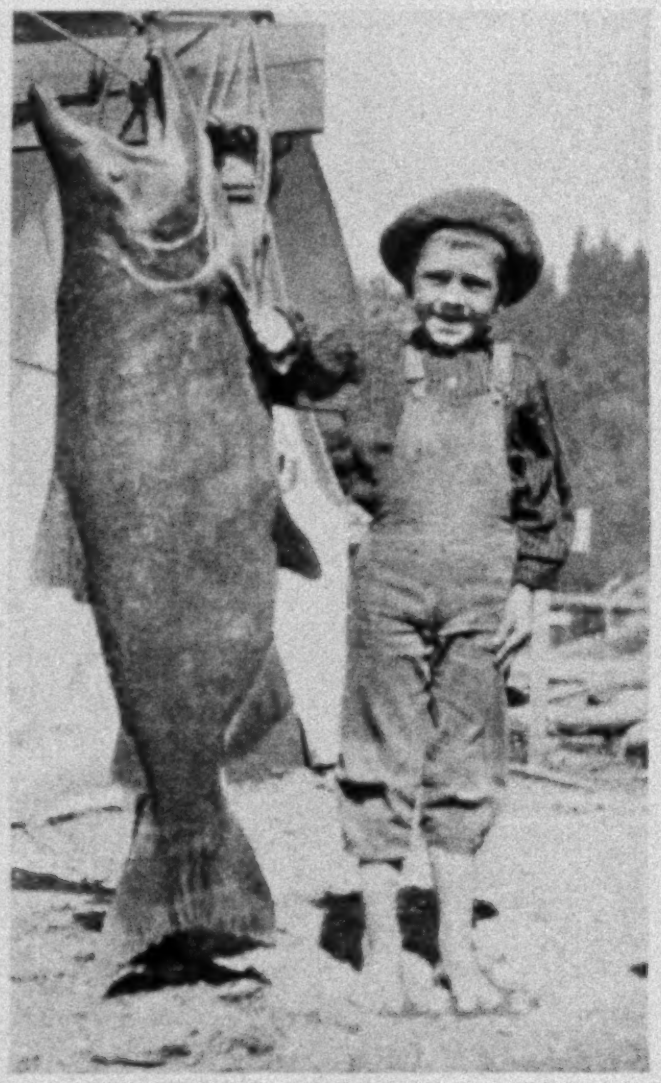
It is worth while examining the developments in Russia from this point of view. Here no practical or effective form of commercial regulation or distribution was undertaken. In consequence of speculation, profiteering, and the failure in commerce to serve public interest, the condition of the industrial classes became so intolerable as to steam the hotbed of revolution.

Justifiable as this revolution may have been and as great a cause of liberty as may result, no one can deny that the whole trend of this revolution has been socialistic, and the latest phase is a development into practical socialism. This strain in the revolution, I am convinced from much experience in Russia, was the reaction from failure of the government and the commercial classes to meet their public duty.

Photograph from U. S. Bureau of Fisheries

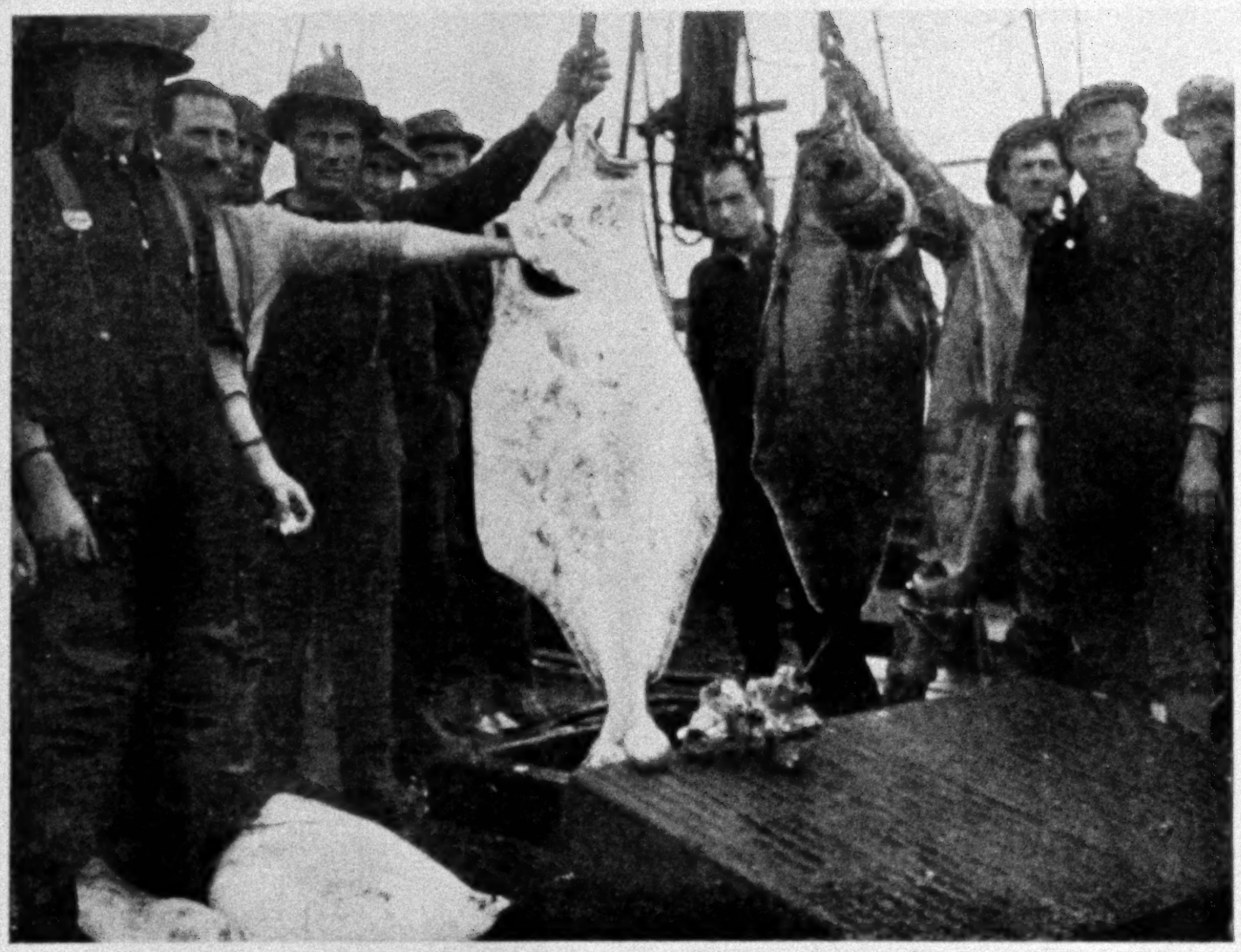
HAUL-SEINING ON THE COLUMBIA RIVER, OREGON: REMOVING THE SALMON FROM THE NET

The number of wholesome fish which can be used for food is astonishing, even to people who are familiar with fish, because the general public knows only a few varieties and neglects several times as many more which are just as wholesome and usually cheaper. In the consumption of fish we stand far behind some of the other nations. A nation-wide movement for the popularization of frozen fish is recommended for this winter. Thousands of tons of this product have been sent from New England to feed the armies of Europe.



Photograph by Henry O'Malley

A BOY WITH A 60-POUND CHINOOK SALMON CAUGHT IN THE COLUMBIA RIVER



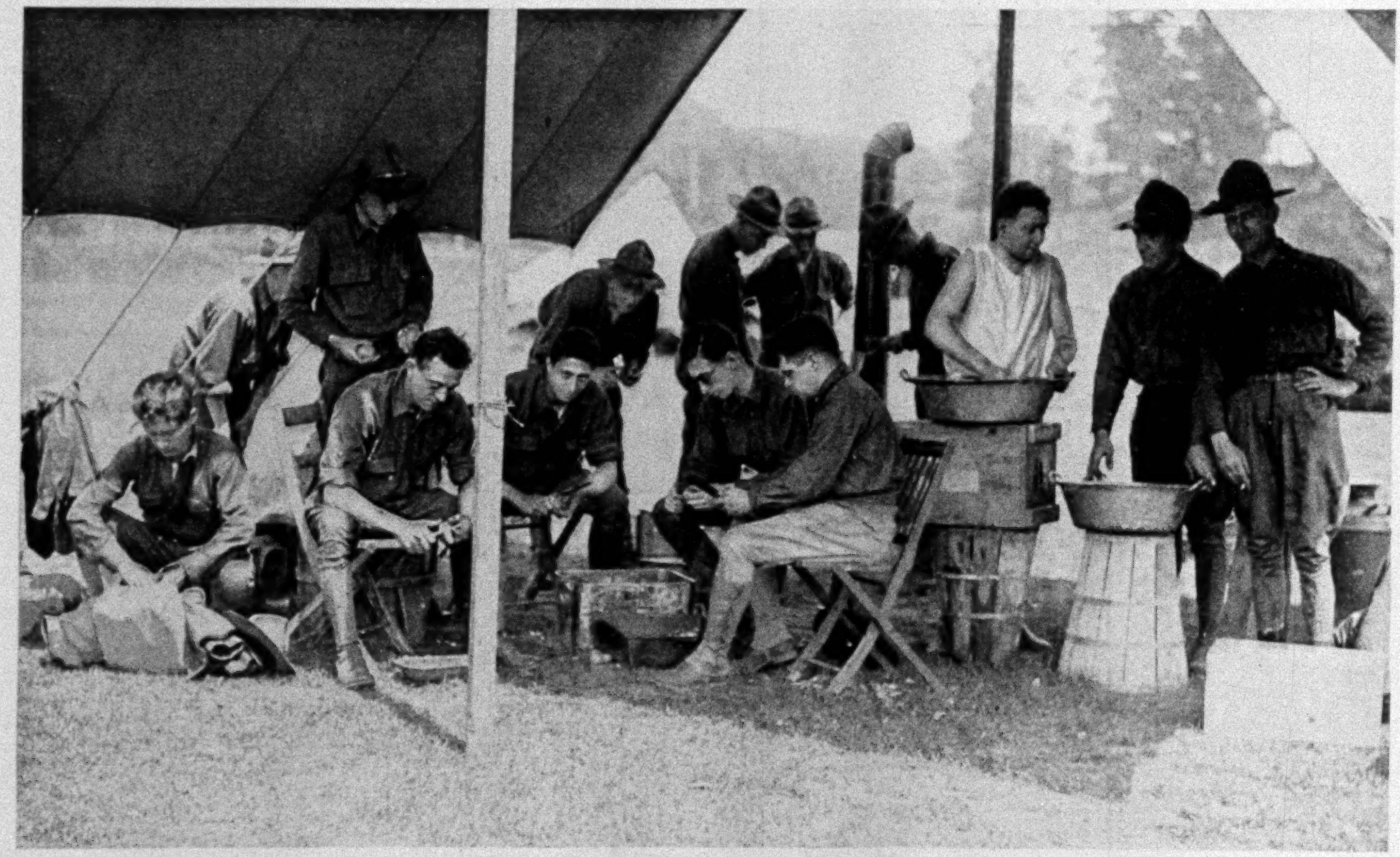
Photograph by Curtis and Miller

HALIBUT STEAKS WILL HELP WIN THE WAR BY SAVING MEAT FOR THE FIGHTERS

Photograph by Paul Thompson

A TYPICAL MESS LINE AT A NATIONAL GUARD ENCAMPMENT

Good food, well prepared and plenty of it, is the invariable rule at all of our new army centers. The men who not long ago were clerks and office workers with soft hand and pale faces are now hardened up and have taken on a deep tan. The physical work of the soldier requires great quantities of hearty food and he is getting it. The extremely small number of men in the camp hospitals is an indication of how well they are fed. The camp cooks have no sinecure.



© Underwood & Underwood

IN THE CULINARY DEPARTMENT OF THIS BATTERY OF FIELD ARTILLERY HUNDREDS OF POTATOES MUST BE PARED, AND FIVE MEN IN THE PICTURE ARE BUSILY ENGAGED IN THE TASK

The work of these splendid fellows includes many uncongenial tasks, like peeling potatoes, but they meet and master every situation cheerfully. Those who cannot serve in uniform can help by enlisting in the food-conservation army. "Compared with the sacrifice of our sons and brothers, it is but little to ask. And it is a service which, if given now, will not be without interest returns for the future" (see text, page 207).

© H. C. White Company

CODFISH DRYING IN THE SUN: GLOUCESTER, MASSACHUSETTS

Gloucester is the leading fishing port of the country, and is especially noted for its trade in cured fish, chiefly cod, haddock, and other "ground fish," which are caught on the banks lying off the New England coast and the British provinces.

THE UGLY ALTERNATIVE IS A GOVERNMENT OF THE GERMAN TYPE

The other end to be attained is of profound importance. The alternative to failure of our commercial system to maintain its place and at the same time serve public interest is rigid autocratic governmental organization of industry of the German type. Such organization is autocracy itself; it breeds bureaucracy and stifles initiative, and thus democracy, at its birth.

We must organize—we must mobilize—our every national energy if we are to win this war against the organization perfected by autocracy. Either we must organize from the top down or from the bottom up. One is autocracy itself; the other, democracy. If democracy cannot organize to accomplish its economic, as well as its military defense, it is a false faith and should be abandoned.

The Food Administration has appealed to the commercial community to march with it to an organization democratic in its inspiration and vital to our defense.

If we succeed, we shall have assisted our commercial institutions to their own stability in after years, and beyond this they will have proved that democracy is a faith worthy of defense.

THE GEOGRAPHY OF MEDICINES

War's Effect Upon the World's Sources of Supply

By John Foote, M. D.

WHEN the war cloud burst in Europe a sudden paralysis of credit temporarily engulfed the Western World. As business relations were restored, ocean travel resumed, and traders set aside the sense of danger, certain secretive individuals crossed from Europe, keeping to themselves and avoiding smoking-room conversation, using the wireless overmuch, and receiving daily aërograms in private code. They were speculators, gamblers, these nervous, anxious-looking unknowns, not dealers in war materials nor food, but speculators in drugs—the kind of things that you and I so frequently buy in the corner drug store.

To gain possession of existing stores of German manufactures, and especially German patented chemicals, was the game these gentlemen played, and at such enormous profits as to make the plungers in "war brides" of later days seem conservative bankers by comparison. For instance, the speculator who in July, 1914, invested $1,000 in antipyrin, used extensively in headache remedies, would in 1915 or 1916 have a profit on his purchase of $19,000, with no possible chance of a slump in the market. This was practically true of all patented German medicinal chemicals in general use, as well as many substances necessary in the arts and sciences.

No merchant sells more diversely born or more widely traveled merchandise than the pharmacist, and accordingly no business is so quickly disorganized when trade routes are disturbed as the importing and distributing of drugs; for the arteries of trade are like the arteries of the human body—sensitive throughout to any change in the volume of flow in even the most remote branch.

The law of supply and demand applies likewise to drugs; therefore it would be as natural to expect a rise in German chemicals as to look for an increase in the cost of coal if all the mines stopped working for a year.

For a time no marked change occurred in drugs imported from neutral lands, for there were large stocks on hand; but as trade routes were disturbed by the closing of old markets and the difficulties of transportation increased, due to hazards of the sea, and consequently warehouse stocks were exhausted, slowly but surely came the upward swing in the cost of dozens of crude drugs and their by-products—drugs which are gathered in strange nooks and in hidden corners of the world as far from the clash and the turmoil of battles as ever they could be.

"East is East and West is West"

It is many a weary mile from the ancient Persian city of Herat, in Afghanistan, to the Western war front, as it is from the Western war front to the East Side of New York, and the men of the Four Tribes had never heard of Moe Klipstick, nor of the druggist at the corner of Third avenue; yet each was related to the other in terms of world commerce, and I will tell you how.

Morgab the Younger, like his ancestors of the Four Tribes, went down yearly from the old city of Herat, midway between the mountains and the Persian desert, to the arid plains, which, after the rains, waxed rich in verdure, because it was here that, with much back-bending, he incised the Ferula root and obtained its milky gum, which he sold to traders in the market-place of his native city that they might, in turn, send it far away, whither and why he knew not nor cared.

Around the caravan fires at night he had heard mutterings of a great war between the Russians and some other unbelievers, and though trading was better since the Russian railroad had come to within 65 miles of Herat, across the mountains, yet he did not like those Muscovites; so, Allah be praised! let them fight among themselves; it was well they should. It could not hurt him!

Months passed, and one day, after an absence on the plains searching out and

© Mrs. H. P. Kimball

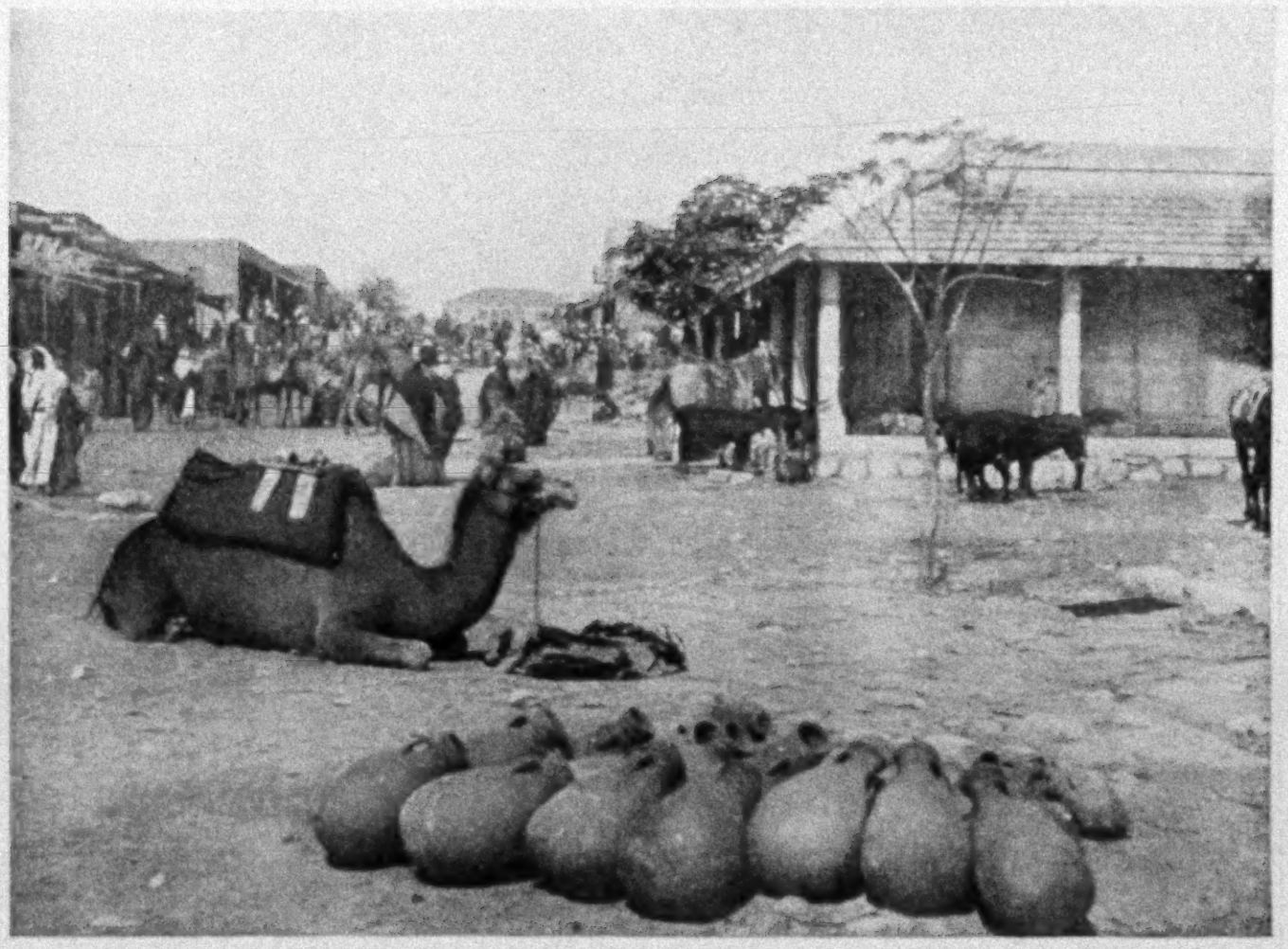
A NATIVE DOCTOR AT WU HU, CHINA, WITH HIS MEDICINES SPREAD ON A SHEET

American patients would probably not thrive under Chinese medical treatment; but at the same time the American drug store would lose some of its best medicinal materials were China cut off from trade with the United States.

collecting that which he could sell, he found his way back to the ancient city of his birth, sweating beneath a back-load of reeking asafœtida gum, and even his calm Eastern mind was disturbed and rendered uneasy to find the market-place glutted with the ill-smelling stuff he had toiled so hard to obtain.

Everywhere was merchandise and everywhere profane excitement. Gaunt camel drivers from the across the mountains in Turkestan murmured, first spitting upon the ground in testimony of their contempt for the Christian dogs; how the Russian railroad had refused to transport their great bales and boxes; others told how the boats on the Oxus were already overloaded and left great piles of freight to spoil on the docks. From Kabul came whispers of the Pathan preparing to war in strange lands and having no time for trade. Certainly ill luck stalked at will throughout the land of his fathers.

In the cool of the evening, when the sun had set and he and his fellows gath-



WHERE DRUGS ARE SOLD: BEERSHEBA, ARABIA

"Gum tragacanth—used as a substitute for gum arabic in medicine and the arts, of which Aleppo, an ancient Syrian drug market, where Venice had warehouses in her golden days, is the trade center, is shipped through Aden or the ports of India" (see text, page 235).

ered together to discuss the strange happenings unknown before in their lives, there came forth strange tales of the deadly perils to ships on the seas—since across the far deserts, in the Persian Gulf, strange sea monsters lay in wait for peaceful traders and destroyed them from below. And Morgab, because he was weary and penniless and very sick at heart, cursed Something—he did not know what—for the calamity that had come to him unbidden.

THE FIRST PINCH

It was fully a year later when Moe Klipstick, who resided in Manhattan, hurried to the drug store at the corner of Third avenue to buy a remedy beloved of his fathers, so that his little daughter—one of the myriad that swarmed in a reeking tenement—might be protected against infection from infantile paralysis. (Such is the pathos of ignorance! For did not *pharmakon* originally mean magic?)

But lo! when he asked for five cents' worth of asafœtida, which was to be put in a bag and suspended about his daughter's neck, the drug-store "doctor" told him abruptly that he could not sell such a small quantity, since asafœtida had gone up "on account of the war." Staggered and humiliated by this unexpected catastrophe, Moe Klipstick slunk from the store, nervously fingering his solitary coin.

When the tiny girl was taken sick a few days later and her restless little feet grew limp and inert, Moe Klipstick raised up his patient voice in puzzled protest at the militant Russia from which he had fled, but which still pursued him and denied him strong-smelling medicines to save the life of his baby.

THE FAR-REACHING TIDE OF WAR

So the many strange conveyances for drugs—dromedary caravans in Persia and Arabia, side-wheel steamers in the reaches of the Amazon, spice trains in

© Underwood & Underwood

A FAST FREIGHT IN CEYLON

Nux vomica is another important drug that comes from the far-away regions of the earth, and reaches western nations only by the long hauls that high ocean-freight rates largely preclude in these days of submarine warfare. It consists of the dried ripe seeds of a small tree which grows in India, Hindustan, Java, Sumatra, Malabar, Ceylon, and North Australia. The tree resembles our dogwood, and its fruit looks like a small orange. The flat seeds, sometimes known as dog buttons and crow figs, have the pulp removed from them by the natives. Strychnine is much prepared from nux vomica.

Aleppo, bullock carts in Ceylon, dog sledges in Siberia, swift dahabiehs on the Nile flood, great lumbering junks bumping along on the thousand-and-one yellow streams of China, pannier-laden coolies in Formosa—all sooner or later were to feel the paralyzing influence of the world war on peaceful trade and exchange. And even in the far places, out at the very rim of the world, strange tribesmen were to cry aloud in outlandish tongues against this invisible clutching thing which, while they wondered, took away their bread.

It was the trade in drugs and spices which made Venice from the thirteenth to the sixteenth century the most important commercially and the richest city in Europe, and it was the loss of this commerce which caused her rapid deca-

Photograph by O. W. Barrett

WINNOWING MAFURRA SEEDS FOR EXPORT AT CHAI-CHAI, ON THE CROCODILE, OR LIMPOPO RIVER: PORTUGUESE EAST AFRICA

The seed contains about 60 per cent of oil and tallow and is worth about $25 to $35 per ton f. o. b.; about 3,000 tons are exported (mostly from Inhambane) and at least 100,000 tons are left to decay. The tree is *Trichilia emetica*, a relative of the Mexican mahogany.

Photograph from Charles K. Moser

THE WATER FRONT AT MUKALLA, ON THE INDIAN OCEAN, COAST OF ARABIA

Myrrh comes from a tree developed in the form of an undergrowth in the Red Sea coast, where vegetation is scant, water scarce, and temperature high. Myrrh is formed like cherry-tree gum, or from artificial incisions through the thin bark. It is at first a juice, then oily, soft, yellowish, golden, finally hard and reddish. It is collected mostly by the Somali, both at home and across the Aden Gulf, in Arabia, and formerly entered commerce by way of Egypt. It is now, in normal times, carried to the great fair of Berbera, there purchased by the Banians of India, and shipped by way of Asia to Bombay, where it is assorted into grades and put into chests and sent to the markets of the world.

Photograph by Bourne & Shepherd

DOWN THE JHELUM, IN KASHMIR

"So the many strange conveyances for drugs—dromedary caravans in Persia and Arabia, sidewheel steamers in the reaches of the Amazon, spice trains in Aleppo, bullock carts in Ceylon, dog sledges in Siberia, swift dahabiehs on the Nile flood, great lumbering junks bumping along on the thousand and one yellow streams of China, pannier-laden coolies in Formosa—all sooner or later were to feel the paralyzing influence of the great world war on peaceful trade and exchange" (see text, page 215).

© Mrs. H. P. Kimball

BURDEN BEARERS IN JAVA

The Dutch East Indies have for centuries supplied the Western World with much of its spices and more of its raw drugs. Tens of thousands of tons have gone to market in such baskets as these.

dence and the passing of her riches and her glory.

THE SUBMARINE, THE AËROPLANE, AND CASTOR OIL

It is not generally known that most of the castor bean from which castor oil is pressed comes to the United States from India. Indeed, our annual importation in normal times is nearly a million bushels. The Orient has always produced this "delicacy" of our childhood days, and it is interesting to remember that the Ebers papyrus, an Egyptian medical manuscript, written when Moses was a young man, speaks of the medicinal virtues of the castor plant.

Today importers are viewing with apprehension (and children with joy) the castor-oil situation. Not only is production lessened, but with the difficulties of sea transportation from India are increasing with the lack of ships. In fact, earth, heaven, and ocean seem to conspire against castor oil; submarines are ambitious to send it to the bottom of the sea, while aëroplanes demand it as a lubricant in large quantities. Therefore, with our ambitious air program and our diminishing supply of oil, we have reason to study the situation a little.

However, the castor plant will grow rapidly almost everywhere; it is frequently seen cultivated in our gardens. The machinery for crushing is also available; so if a shortage really becomes inevitable, the Department of Agriculture will be able to incubate another infant industry.

THE GLORY OF VENICE AND THE DRUG TRADE

The story of Venice is so essentially romantic that to mention commerce in connection with it seems out of drawing. Yet it was as merchants that the Venetians were famed. The traffic in spices and aromatic drugs began to assume vast

Photograph by A. Nielen

MASSING THE FLEET: SINGAPORE

The island of Singapore is an important producer of herbal medicines. One of its crops is aloes. This is a drug of great antiquity, which has figured in tens of millions of tonic and cathartic prescriptions. It is grown much like opium—the tears of sap gathered as they form on artificial incisions. It is also prepared by evaporating decoctions of the leaves.

proportions in the Middle Ages, as the people of Europe became educated to a hunger for the spicy flavors of the East. From India and China and Persia came not only silks and laces, but, more important, spices and oils and drugs, and Venice was quick to realize the importance of having this commerce pass through her port.

The knowledge of medicines used by the Moors and Arabs, which was brought back by the Crusaders, helped to educate the people of many lands to the uses of balsams and spices of the Oriental markets. The embarkation point for Palestine was Venice. The Venetian merchant marine profited well by furnishing transport service, and during the Fourth Crusade, finding the Crusaders unable to pay their passage money, the Venetians forthwith enlisted them as soldiers in a war against their Christian neighbors, the Dalmatians, and the Infidels got off scot-free!

THE MERCHANTS OF VENICE

Acre, held by the Crusaders as a Christian bulwark in the Holy Land from 1191 to 1291, has a custom-house record of great quantities of rhubarb, musk, pepper, cinnamon, nutmegs, cloves, aloes-wood, camphor, frankincense, nutgalls, and ginger which were stored there en route to Venice. The Venetian merchants rolled in wealth, for they fared far and wide and their galleys were known on every sea. Huge storehouses were erected wherever they traded—as far away as Beirut, Ajaccio, Aleppo, Alexandria, and even in the thirteenth century they imported from these places myrrh, sandalwood, camphor, indigo, and spices. In the fourteenth century Venice fought Genoa for trade mastery, and thence forward was supreme. Daru in his "History of Venice" estimates and translates the value of Venetian exports in the fifteenth century as $10,000,000 annually—a sum larger that a billion in these times. She possessed at this time 300 great man-propelled galleys, or argosies, and several thousand smaller vessels, with 45 large war craft.

In the Rialto was the center of Venetian commercial life. Here Shakespeare pictured his Antonio, whose mind he represents as "tossing on the ocean" with his argosies. Across the Alps went German caravans from Venice; up to Holland and Belgium sailed her Flanders galleys, precursors of our armed merchantmen, each rowed by 180 oarsmen, with archers for protection against pirates. Venice met at Bruges the merchants of northern Europe, though some galleys also went to London and Southampton. Venice served Europe well as a carrier, but she exacted heavy toll in payment.

THE DECADENCE OF VENICE A MATTER OF GEOGRAPHY

The monopoly of Venice was resented, as is inevitable; her prosperity was envied. This is why all the explorers of that period sought a short ocean route to India. Columbus, it will be remembered, sought the "spices of the Indies" rather than a new land. So from the hour when, on May 20, 1498, Vasco da Gama fulfilled the ambition of his Portuguese sovereign, blazed a new trail in the uncharted deep and sailed into Calicut, after rounding Cape of Good Hope, the commercial greatness of the Italian port was doomed.

When the news reached Venice that Portuguese carracks laden with spices had come into the harbor at Lisbon without the necessity of touching at Venice "the whole city was disturbed and astounded," so says the ancient chronicler, Priuli, in his diary. They had ample cause for worry, for they faced the inevitable.

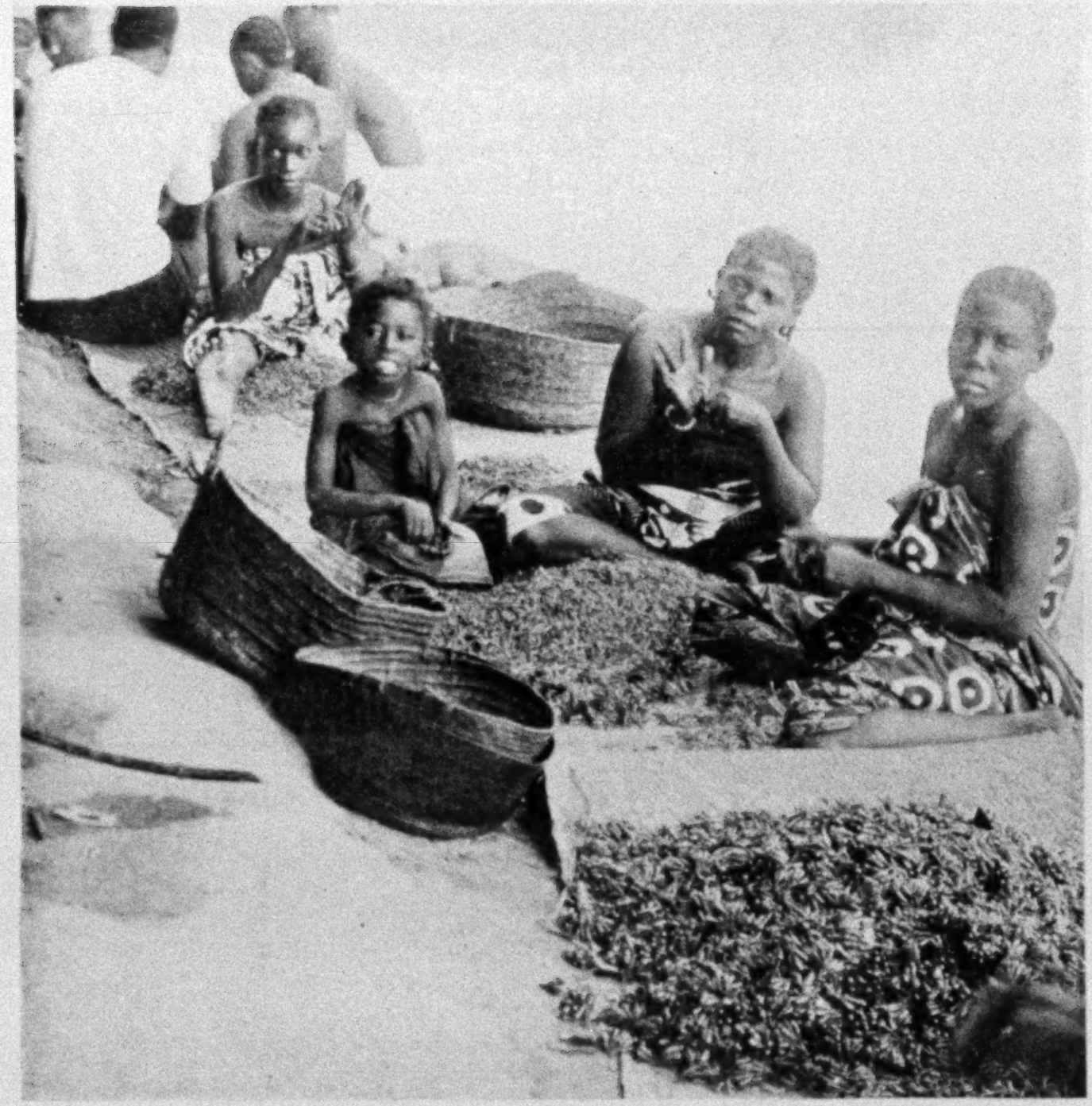
THE WARS OF THE CLOVE

How Venice warred on Portugal; of the later wars between Portuguese, Spanish, Dutch, and English to assert supremacy in the spice and drug trade; of the long voyages, with decimation of the crews by pirates, by mutineers, and by the often fatal and always horrible scourge of scurvy—these tales belong to the heroic age of the seas, and have furnished inspiration to many a poet and novelist. Noyes' "Knight of the Ocean-Sea," singing the praise of the English navigators, has caught well the spirit of those dauntless adventurers:

XUM

CLOVE DRYING IN ZANZIBAR

"In the beginning of the seventeenth century that odoriferous pistil (the clove) had been the cause of so many pitched battles and obstinate wars of so much vituperation, negotiation, and intriguing that the world's destiny seemed to have become almost dependent upon the growth of a particular gilly-flower. Out of its sweetness had grown such bitterness among nations as not torrents of blood could wash away" (see text, p. 227).



BREAKING CLOVES FROM THE STEMS: ZANZIBAR

The clove, as we know it, is the partially developed bud of a tree which grows to a height of about 15 feet. These buds are produced in great profusion in clusters. These clusters are gathered and dried, turning from red to brown. The unexpanded corolla forms the head and the calix the stem of the clove. Once dried, the cluster of cloves is broken from the stem by pressing them against the palm of the hand. The woman in the middle foreground is demonstrating the process.

"Marchaunt adventurers, chanting at the windlass,
Early in the morning, as we slipped from Plymouth Sound,
All for adventure in the great New Regions,
All for Eldorado and to sail the world around!
Sing! the red of sunrise ripples round the bows again.
Marchaunt adventurers, O sing, we're outward bound,
All to stuff the sunset in our old black galleon;
All to seek the merchandise that no man ever found!"

Well might he sing of Drake, and Hawkins, and Greenville, and Oxenham meeting, with their little 200-ton ships, the great galleys of Spain and defeating them! But the prizes they captured were galleons laden with cloves, and ginger, and pepper, and frankincense, and dragon's blood, and cinnamon, and when these cargoes were found they asked not for doubloons.

Motley, in his "History of the United Netherlands," emphasizes this point very

Photograph from Harold Hartshorne

A CANAL SCENE IN THE NEIGHBORHOOD OF COLOMBO, CEYLON

From the impenetrable jungle, the high plateau, the wilds of Siberia, the lonely reaches of Tibet, the wastes of Africa—from a thousand sources come the things which compose the medicine we take. A single prescription may call upon the resources of five continents in its filling.

XUM

Photograph from Walter L. Beasley

A YAKUT FREIGHT REINDEER CARAVAN CROSSING THE VERKHOYANSK MOUNTAIN

The caravans which carry raw drugs to market often come back with patent medicines made in America as a part of their cargo. A recent traveler from the Yakut region tells of being hailed with delight in a tiny shack town. A boy was sick and no one was there well enough versed in the art of dosing to measure out a spoonful of "pain cure" for him. The natives believe white man's medicine dangerous except when measured by a white man's hand.

Photograph from Mabel A. Spicer

KHYBER PASS: A CARAVAN ENJOYING A SHORT REST IN ITS JOURNEY FROM AFGHANISTAN TO INDIA

"It is many a weary mile from the ancient Persian city of Herat, in Afghanistan, to the Western war front as it is from the Western war front to the East Side of New York, and the men of the Four Tribes never heard of Mee Klipstiek, nor of the druggist at the corner of Third avenue, yet each was related to the other in terms of world commerce" (see text, page 213).

A COOLIE BRINGING IN A LOAD OF TU-CHUNG BARK (*Eucommia ulmoides* Oliv.), A VALUED TONIC MEDICINE: YUNGYANG HSIEN, CHINA

"And even in the far places, out on the very rim of the world, strange tribesmen were to cry aloud in outlandish tongues against the invisible clutching thing which, while they wondered, took away their bread" (see text, page 216).

well. "The world had lived in former ages," he says, "very comfortably without cloves." But in the beginning of the seventeenth century that odoriferous pistil had been the cause of so many pitched battles and obstinate wars; of so much vituperation, negotiation, and intriguing, that the world's destiny seemed to have become almost dependent upon the growth of a particular gilly-flower. Out of its sweetness had grown such bitterness among nations as not torrents of blood could wash away. A commonplace condiment it seems to us now, easily to be dispensed with, and not worth purchasing at a thousand human lives or so the cargo, but it was once the great prize to be struggled for by civilized nations.

And so Venice and Alexandria punished the nations who took their spice trade away with the unholy spell of war, a curse that all through history has both preceded and followed every marked change in the trade routes of the world.

The changes in drug prices which have

A MARKET-PLACE IN THE SULTAN'S DOMINIONS

Turkish opium has long been considered the highest grade for medicinal use in the market. Before the war Turkey dominated the high-class opium trade of Europe.

come in this war are due chronologically to the blockade of Germany, in relation to the enormous chemical manufacturing industry of that country; to speculation in existing stocks at the outbreak of the war; to the congestion of transportation both by land and sea and terminal facilities in belligerent countries; to the removal of blockaded shipping from world trade, causing a shortage in sea transports; to the destruction by commerce-raiders of shipping and cargoes and the high marine insurance and freight rates; to the diversion of labor to war purposes from trades concerned with the gathering, marketing, or manufacturing of drugs and medicinal substances, and to the accumulation of stocks of drugs by army organization.

SOME PRICES COMPARED

It is interesting to compare some of the prices per pound quoted in wholesale drug trade bulletins in July, 1914, and then a year later. Bleaching powder or "chloride of lime"—used in the arts and as a disinfectant advanced from 1⅜ cents to 9 cents per pound; sal-soda or washing soda, from 60 cents to 85 cents; nitrite of soda, valuable both as a medicine and for its nitrogen, from $1.90 to $3.25; chlorate of potash, from 15 cents to 45 cents; oxalic acid, from 13 cents to 50 cents per pound; quinine, from 16 cents to 50 cents an ounce; caffeine, from $4.25 to $11.50 an ounce; epsom salts, from 1¾ cents to 3¾ cents a pound; oil of wintergreen (artificial), from 55 cents to $3.60 a pound; permanganate of potash, a disinfectant, from 14 cents to $1.50 a pound; sodium salicylate, used for rheumatism, from 65 cents to $4 a pound; thymol, a specific for hookworm, from $1.20 to $6.50 an ounce; antipyrin, from 30 cents to $3.00 an ounce; phenolthalein, used both as a chemical reagent and as a laxative medicine, from 80 cents to $48 a pound. These are chemicals, many of which came from Germany, and their advance was usually a direct result of the law of supply and demand and of speculative hoarding.

A ROSE BY ANOTHER NAME

Aspirin is a compound of salicylic acid almost universally used for all kinds of aches and pains, and until recently the patent on the drug was held by a German

Photograph by Alfred Heinicke

A "POPPY PEEPER" COLLECTING POPPY JUICE IN THE CULTIVATION OF OPIUM: SHIRAZ, PERSIA

These trained observers look within the flowers to judge of their maturity

firm. Shortly after the outbreak of the war it began to rise spasmodically until, under its unpatented title, it caromed from 32 cents a pound to $1.25 a pound. For be it known, aspirin, of a lineage slightly different from the German article, sometimes traveled incognito as acetyl-salicylic acid, and was identical in everything save name and price.

HARD ON THE BALD-HEADED

Carbolic acid is really the parent substance of these aspirin and salicylate preparations, and, as everybody knows, it is also an excellent and much-used surgical antiseptic—two good reasons why the price should gyrate when war broke out; and gyrate it did. From 25 cents a pound

Photograph by Alfred Heinicke

OPIUM SMOKERS IN A PERSIAN TEA HOUSE—OPIUM AND SWEET TEA, VERY SWEET, WITHOUT MILK, IS TAKEN DURING THE SMOKING; SHIRAZ, PERSIA

AN OPIUM EXPERT EXAMINING SAMPLES

Great shipments of opium from a thousand sources find their way to central points, where examinations by trained men decide its ultimate destination and price

Photograph by Alfred Heinicke

WEIGHING THE ONE-POUND LUMPS FOR THE FARMER; OPIUM CULTIVATION SHIRAZ, PERSIA

"Opium in February last had jumped to $19.05 a pound as compared with $8.05 in 1913 and $11.05 in 1915. . . . The tremendous use of anodyne medicine to relieve the pain of the millions of wounded has undoubtedly had a stimulating effect on the price of opium and morphine" (see text, page 234).

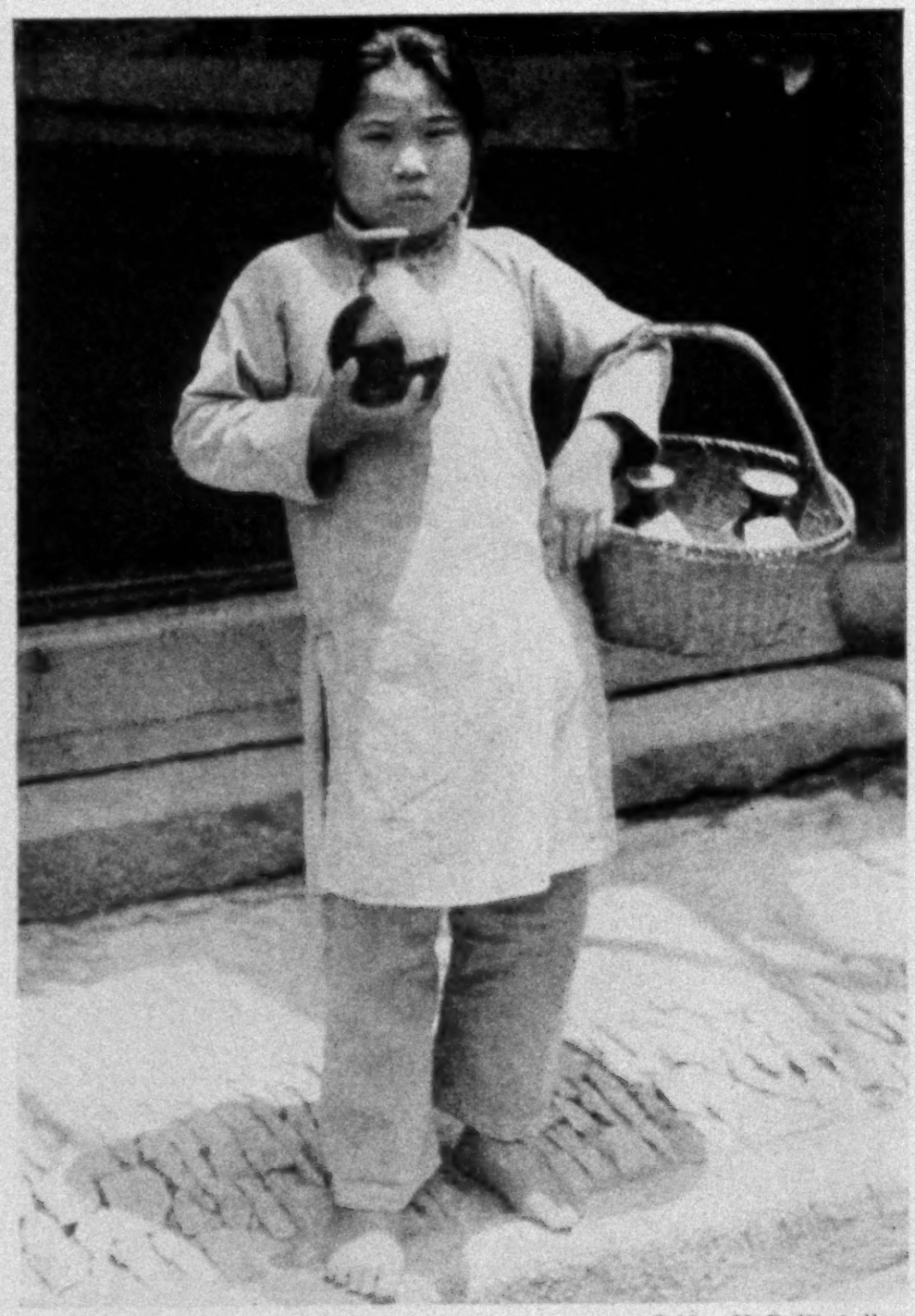
to $2 the pendulum oscillated. Now it is cheap once more at about 75 cents a pound, not more than 200 per cent higher than in 1914!

The war bore heavily on bald-headed and nervous people. Practically all hair tonics nowadays contain resorcin—a coal-tar product we have always allowed Germany to make for us, and another cousin to carbolic acid. From $2 to $32 rose the price of a pound of resorcin, putting a sudden damper on the enthusiasts of intensive scalp culture. And the bald found it costly to be nervous over this advance, since bromide of potassium, long used to calm excited nerves, advanced from 50 cents to several dollars, and at one time it touched $12 a pound! These excessively high prices were speculative phenomena, and did not hold at the maximum level, though bromides are still $1.20 a pound and resorcin $24 a pound.

Practically all remedies for the round-worm of children contain santonin. Santonin ballooned to dizzy heights in a few months—from $13 to $75 a pound. It is now relatively cheap at about $50 a pound. But as a pound would supply about 11,000 doses, we do not need this drug in carload lots!

ROBBING PETER TO PAY PAUL

Some chemicals have advanced more recently for indirect reasons. For instance, a rise in sulphuric acid is attributed to the fact that iron pyrites come largely from Spain, and the war has had a sinister effect upon Spanish commerce. As pyrites are used to manufacture sulphuric acid, their price and the price of the acid rose proportionately to the effectiveness of the underseas boats. The rise in copper had an indirect effect on certain phases of the chemical industry, as copper and sulphuric acid were largely used to generate sulphuretted hydrogen, a very valuable reagent in the laboratory.



© Mrs. H. P. Kimball

A SELLER OF DRUGS: CHINA

From the heart of China comes much of the opium which has stilled the mortal pains of the millions of brave men who people the hospitals and tenant the graves of the Western front in the Armageddon of civilization. Since the Turkish supply has been cut off, India and China have to furnish the bulk of the unprecedented quantities required by Allied countries.

Photograph by Ella R. Christie

HOUSES AND A NATIVE CART: NOVI URGENTSCH, RUSSIAN TURKESTAN

Colocynth, one of the most valuable cathartics in medicine, has been all but cut off by the war. It comes from a plant resembling a watermelon, which grows mainly in Arabia, Syria, Egypt, Morocco, Cape of Good Hope, Greece, and Spain. The best colocynth grows in Palestine, and is now entirely out of the market. Formerly it reached the outside world through Joppa and Trieste.

Photograph by E. H. Wilson, Arnold Arboretum

PACKING BARK IN CHINA

At one time Ceylon excelled in the cinnamon industry, but coffee largely has replaced it, thus restricting to the neighborhood of Colombo the principal cinnamon gardens; however, South China has become equally interested in the cultivation, and as a result produces much valuable bark. The cultivation of cinnamon begins with the planting of seeds in prepared soil, four or five in each hill. In five or six years the trees are ready to produce bark. The barking season begins in March and ends in June. The bark is removed and allowed to ferment and then scraped. When dried, it is exported loose or in bundles, with split bamboo bands from Canton, Hongkong, Calcutta, and Colombo.

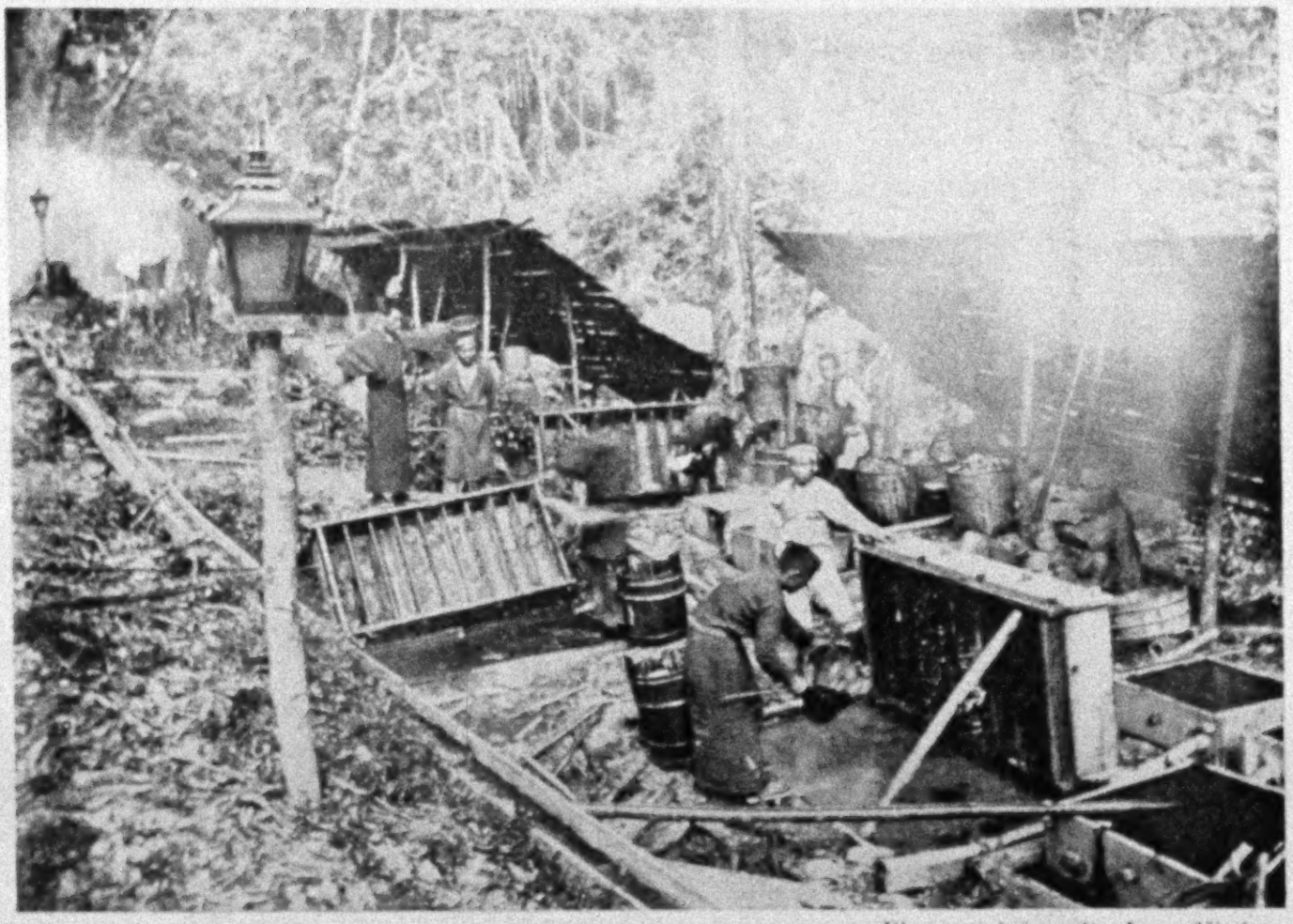
A cheaper substitute has been evolved as a result. These indirect effects might be multiplied almost infinitely; they touch almost every phase of the development of the war.

The effect of closing many markets for products of neutral countries must also be considered. A good example in the trade is copra, or dried cocoanut kernel, from which cocoanut oil is pressed. Madras, India, a shipping center for this article, reports a decline of 51 per cent in the quantity exported in 1916. Germany and Russia were extensive users of copra; also Belgium. A decline of 27 per cent in the exports of oil of sesame and essential oils in 1916 was also noted in Madras. The use of palm oil in England in the making of artificial butter has resulted in greatly increased production and a market which will probably be permanent—showing that "it's an ill wind, etc."

"THE HIGH COST OF TWILIGHT SLUMBER"

Some of the most remarkable advances in price are seen in vegetable drugs. Russian henbane is a source of hyoscine, or scopolamine, an ingredient in the much-exploited "twilight sleep" preparation, and this drug jumped from 8 cents a pound in 1914 to $3 a pound in 1916.

Belladonna, from which atropine is made—atropine the handmaiden of the eye specialist—was cultivated for commercial purposes in Germany and England. The cutting away of the German supply caused the price to rise from 50 cents to $1.75 a pound within the first year of the war. Now England is making efforts in intensive cultivation of belladonna and other botanical drugs, and



Photograph from Dr. Inazo Nitobe

BUSY SCENES IN FORMOSA

"After the Japanese-Chinese War, Japan obtained control of the Formosa camphor industry. Although the Formosa forests are practically inexhaustible, forestry measures were instituted for the replanting and care of trees" (see text, page 236).

the Arlington drug gardens, located near Washington, D. C., conducted by the United States Department of Agriculture for the experimental cultivation of medicinal plants, have been more than a successful experiment and it did not require the war to make their utility apparent.

OPIUM AND THE BLOCKADE

It will be noted in scanning the quotations that products to which England has direct sea access have had a definite but not spectacular increase in price. Opium increased in price very gradually from $9.05 in July, 1914, for crude gum, to $35.00 per pound today. In the case of opium adequate production and well organized distribution came into play to stabilize the market. But storehouse stocks for medicinal purposes were gradually exhausted and the war shifted to opium producing countries, depleted their man power, and finally threatened the trade routes.

The ring about the Central Empires soon included Constantinople—probably the largest single exporting center for the poppy juice. Moreover, Turkish, or, as it is known, Constantinople opium, has always been considered the highest grade obtainable for medicinal use. Persian opium probably ranks next in importance, though both the Indian and the Persian products are now largely used in the manufacture of morphine. China's immense crop was, until recent times, consumed within the empire, while Egyptian opium was exported to English chemical houses to some extent. Even Bulgaria produces some opium, and it is found in most of the various ports in Asia Minor. But Turkey dominates the European supply of high-grade gum.

Now, the failure of crops, the shortage of ships, the tightening of the blockade, and the disorganization of trade arrangements is having the inevitable result. Opium in February, last, had jumped to $19.05 per pound, and today it is $35 per pound, as compared with $8.05 in 1913 and $11.05 in 1915. Only limited quantities are sold to each dealer even at this

price. Heroin, or diacetyl morphine, a derivative of opium, used almost exclusively in cough medicines, sells today at $14 an ounce. The tremendous use of anodyne medicines to relieve the pain of the millions of wounded has undoubtedly had a stimulating effect on the price of opium and morphine.

Gum tragacanth — used as a source of mucilage in medicine and the arts — of which Aleppo, an ancient Syrian drug market, where Venice had warehouses in her golden days, is the trade center—is shipped through Aden or the ports of India.

The increased price in products of this type was approximately 100 per cent during the first year of the war, but it continues to rise day by day.

Photograph by F. J. Koch

LOADING LIGHTERS AT ZANZIBAR

Commercial aloes comes to us in tin-lined boxes, cases, casks, tubs, monkey and goat skins from Zanzibar by way of Bombay and in small calabashes from the West Indies.

THE MUSCOVY COMPANY

Concerning Aleppo there is some interesting correspondence in the records of the old English Muscovy Company. Edwards, one of their factors, writing in 1566, said: "Therein are many Venetians . . . who buy gall, tallow, saffron, skins, cotton, wool . . . and also will serve us of all kinds of spices, we giving them sufficient warning to fetch it in the Indies and will deliver it to us in Shamaky."

And as there is nothing new under the sun, another factor tells about the light Russian oil which now, when it is refined, we prize so highly as a medicine: "There is a great river," he wrote, "which falleth into the Caspian Sea by a town called Bachu whereunto which is a strange thing to behold. For there issueth out of the ground a large quantity of oil, which oil they fetch from the uttermost bounds of all Persia, it serveth all the country to burn in their houses. This oil is black and is called Nyfte. There is also by the said town of Bachu another kind of oil which is *white* and *very* precious; it is supposed to be the same that is here called petroleum."

What if the ancient adventurer could have been granted a vision of the oil-burning submarine and super-dreadnaught! He would have thrown his spices to the winds. Today men are fighting for that oil as in his day they fought for cloves!

Another article of commerce which fortunately we do not use today in medicine was shipped from Alexandria. Ar-

CHINESE DRUGGIST AND HIS CHEMISTS; SOOCHOW, CHINA

Although thymol occurs in the oils of horsemint, thyme and wild thyme, which are common in many parts of this country, the world goes all the way to India for its supply of this important drug, so essential in the treatment of the hook-worm disease. It is prepared from ajowan oil, a volatile product obtained from the seed of a plant that is cousin alike to celery and coriander.

thur Linton, in his scholarly monograph in the Journal of the American Pharmaceutical Association, quotes from Hakluyt a letter of a traveler of the sixteenth century who visited Cairo:

"Without the city," he wrote, "are to be seen divers pyramids among which are three marvelous great tombs. Out of them are daily digged the bodies of ancient men not rotten but all whole. And these dead bodies are the mummies which the Phisitians and Apothecaries do, against our will, make us to swallow." Dried mummy was a favorite remedy in the sixteenth century; it is something to know that patients were made to swallow it against their will!

THE CAMPHOR INDUSTRY

Camphor, which is important not only in medicine but in the arts and manufactures, was an example of efficient production and control of output. After the Japanese-Chinese War, Japan obtained control of the Formosa camphor industry. Although the Formosa forests are practically inexhaustible, forestry measures were instituted for replanting and care of trees; 2,000 police were furnished to protect workers and large refining plants were built. Workers were paid a fixed sum. The distribution of the entire product was let by contract and the right of sale awarded an English firm, the latter contracting to conduct the sale of camphor in New York, London, Hamburg, and Hongkong, and to accept from Japan a definite amount of camphor each year. The closing of the port of Hamburg has not, however, demoralized the trade. In July, 1914, American refined camphor sold at 44½ cents per pound in barrel lots. In 1916 it had advanced to 90 cents.

Tragacanth, used in making mucilage and toilet creams, advanced from $1.20 to $2.25; sesame oil from Alexandria, from 38 cents per gallon in 1914 to 65

Photograph by A. W. Cutler

THE CORNER DRUG STORE ON THE EAST SIDE, NEW YORK

cents in 1916. Aloes advanced scarcely at all in the first two years of warfare. The varieties coming from East Africa and from the West Indies are used in medicine. There are many species of aloe and the commercial product is an exudation from their leaves. So many sources are available that aloe was figuratively as well as literally a "drug in the market."

The price of Norwegian cod-liver oil is an index of submarine efficiency. In 1914 the oil sold for 60 cents a gallon; in 1916 for $5.50. Perhaps the German scarcity of animal fats has also something to do with this increase. The rise in price and scarcity of the much-used Russian mineral oil in the first year of the war will be remembered. Here, again, America has been able to utilize native products to supply the deficiency.

BATAVIA—THE ANCIENT QUEEN OF THE EAST

Batavia, as of old, is still a great export center for the spice and drug trade, as it was when it was fortified as the capital of the "Spice Islands," and was known as the "Queen of the East." In those days, when every sea voyage was a perilous undertaking, it was only natural that a warlike community should assemble in such a place. And so picturesque soldiers of fortune and adventurers from all parts of the world gathered about its canals and in its white walls, besides Dutch and Japanese, many Germans, Portuguese, French, Chinese, and Moors; for, of course, being a Dutch city, it was intersected by canals, and, being a rich community, it was fortified.

With its picturesque and adventurous population, its quaint architectural scheme, and its gleaming snow-white ramparts outstanding like a finely chiseled cameo in the glare of the tropical sun against the turquoise ocean, it was a dream city of the departed days of piracy and buccaneering. A garrison of a thousand men was there in the seventeenth century, and an equal number to guard the Dutch monopoly of the cinnamon trade in Ceylon. Today the old fortifications have crumbled; the old "city" proper is no more.

The Dutch still maintain their important position in the spice trade, but instead of sailing vessels fast steamers now ply between Batavia and Amsterdam via the Suez Canal, and Amsterdam remains a great drug exchange. New York, Hongkong, and Singapore are ports of great importance in the world's drug trade, and the London docks are loaded

with odorous bags and bales of the same aromatic drugs, and ginger, and pepper, and cinnamon, and nutmegs that once came a nine-months' journey around Africa in tiny galleots, manned by half-piratical crews who braved desperate battle and shipwreck and the spotted death of scurvy to follow the lure of the sea and carry the "odor of far-fetched spices" to the trading ports of the Western World.

So, although neither Morgab, in Herat, nor Moe Klipstick, in New York, could understand the reason why, and even the druggist at the corner of Third avenue was unable to explain it, there is a direct and intimate relation between war and the corner drug store, and the price of hair tonic in New York may fluctuate with the tide of battle on the battered fields of Flanders.

A FEW GLIMPSES INTO RUSSIA

By Lieut. Zinovi Pechkoff

THE PRESIDENT of the United States, in his message delivered to both houses of Congress, in which he asked for the declaration of a state of war with Germany, said:

"Russia was known by those who knew it best to have been always in fact democratic at heart, in all the vital habits of her thought, in all the intimate relationships of her people that spoke for their natural instinct, their habitual attitude toward life.

"Autocracy that crowned the summit of her political structure, long as it had stood and terrible as was the reality of its power, was not in fact Russian in origin, in character or purpose. And now it has been shaken and the great, generous Russian people have been added in all their native majesty and might to the forces that are fighting for freedom in the world, for justice and for peace. Here is a fit partner for a league of honor."

These are great and true words expressed about my country. When I read them I was thrilled, and my heart rejoiced at the profound penetration of the President into the heart and soul of our people.

FIT PARTNER FOR HONOR LEAGUE

Russia *is* "a fit partner for a league of honor."

Russia does not seek conquest and has not perpetrated aggression. Russia has been always the defender of the small and oppressed Slav nations. Bulgaria, Servia, Roumania, and Greece all owe their independence to the help of Russia, who waged wars against the Turk that they might be free peoples. Wars that were planned by the autocracy were seldom successful and never popular.

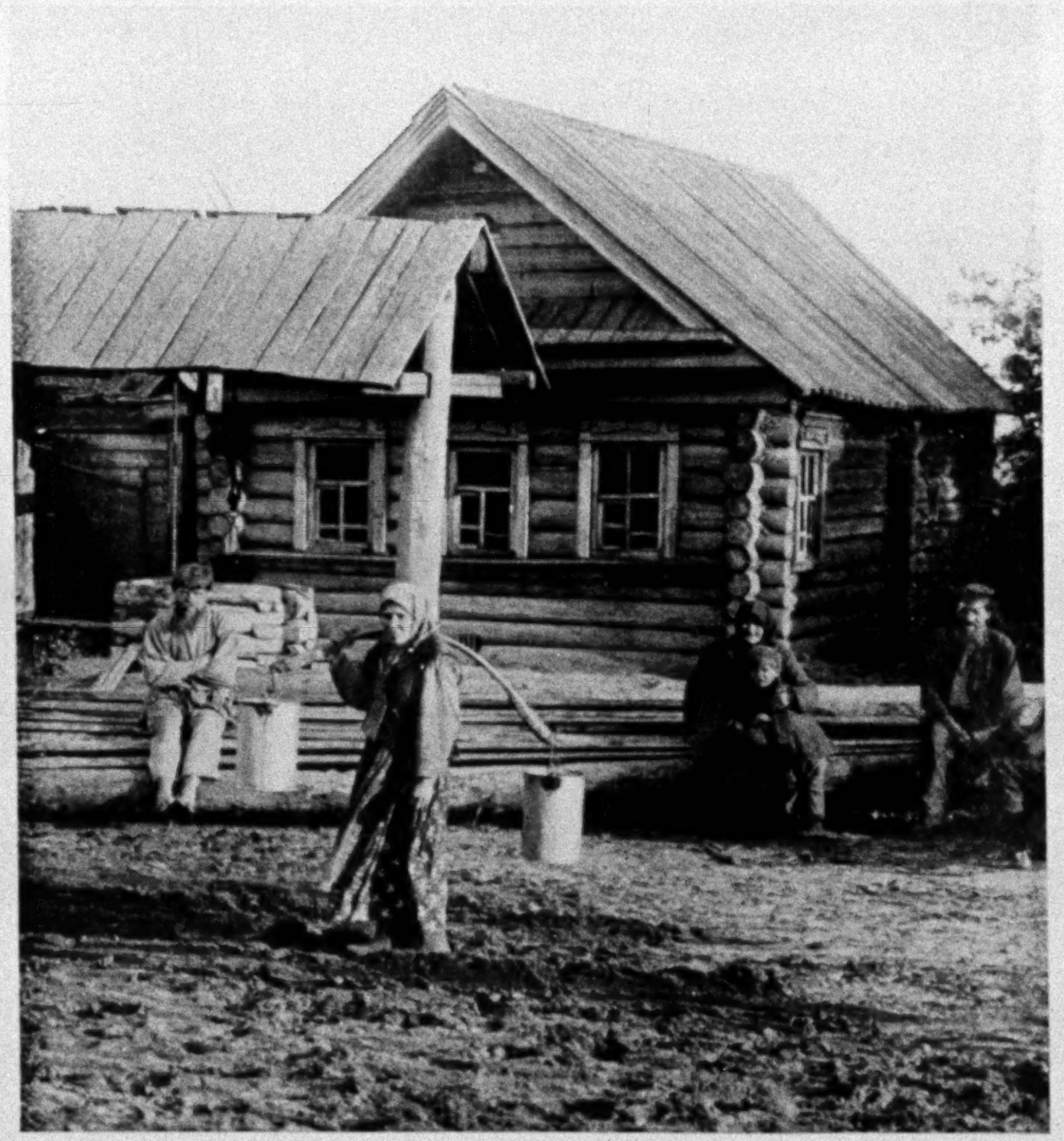
Russia always stood as one man for the defense of right and principles. The people know what it means to suffer for an ideal. Our best men and women have undergone for years and years most terrible sufferings in the prisons, in exile; and many paid with their lives.

The Russian nature is rather passive and very peaceful: but once a Russian is aroused nothing can stand in his way; he will go to the end. Russian nature is peaceful; but woe to the enemy! No sacrifice is too great for the cause of liberty.

THE RUSSIAN NATURE IS ALWAYS DEMOCRATIC

Russian nature is democratic and not aggressive, and has always been so, from the earliest part of Russian history. Our folklore, our legends, the popular poetry of the old ages of Russia, have always told of the Slav nature being extremely democratic. The popular poetry and religion of Russia are remarkable for the profound love of peace and democracy.

After the end of paganism, as before it, warlike subjects played very little part in the religious thoughts of the mass of the Russian people. Even when the pa-



© Underwood & Underwood

A CHARACTERISTIC COUNTRY HOUSE IN THE HEART OF RUSSIA

gan divinities of the Russian Slavs were Christianized they did not on that account lose their pacific character.

For example, let us take St. George, the type of the Warrior Saint. Of this steel-clad warrior, lance in hand, mounted on his great charger, the Russian peasant has made a useful auxiliary in his laborious life. He has given St. George the care of the village pasture.

In the spring of each year, on the 23d of April, which is St. George's Day, the peasants of all Russia lead into the fields their herds of cows, their horses, their sheep, exhausted by the long winter's stay in the *byre*. Early in the morning of this day the peasants and their womenfolk make the rounds of the sown fields, begging St. George "to rise early in the morning, to open the soil and to sprinkle dew on the clover and grass."

Then they take out their flocks and herds, which they drive with branches of willow blessed in the church, and pray to the "kindly George to guard their herds in the fields and the woods from the

THREE YOUNG LADIES OF NIZHNI NOVGOROD PHOTOGRAPHED BY THEIR OWN REQUEST

greedy wolves, the cruel bears, and every ill beast."

In the Germanic epics Thor, the patron of the toilers, is constantly overridden by Odin, the warrior. It is just the contrary in the Slav epic. The best loved and the most popular hero of the Russian "bylinas" (legends) is Ilya Mourometz, "the Peasant's Son." This is the epithet which invariably accompanies Ilya's name in all the "bylinas."

RUSSIAN HEROES AS SOIL DEFENDERS

Ilya, according to the popular tales, performed a great many exploits in the defense of the Russian soil. Having received from his father, the aged peasant, the commandment "to plot nothing against the Tatar nor to kill the Christians, and to do good and not evil," Ilya tries religiously to observe these commands and uses his strength only to struggle against evil and the enemies of his country.

He is a peasant warrior who seeks neither aggression nor conquest and who accepts battle only as a means of legitimate defense. The hero of the Russian legends is, above all, the defender of the native soil.

All through the Russian epics you see the heroes as the guardians of the people's independence, but by no means the oppressors of other people. Whenever the numerous Mongol tribes in ancient times would assail Russia, the princes of the various Russian States would call the "bogatyrs," who always personified the people, to defend the Russian soil.

They would leave their plows, their peaceful tilling of the land, gather to the prince, drive away the enemy, take no rewards, nor acquire any privileges by their defense, and afterward would not

Photograph from Boston Photo News Company

THE ST. VLADIMIR MONUMENT AND THE RIVER DNIEPER: KIEF, RUSSIA

Sixty-two feet high, cast in bronze from the design of Baron Klodt, it was erected in 1853. The relief on the lofty pedestal represents the baptism of the Russian people. Above is the figure of the saint holding a cross. In 988 St. Vladimir adopted Christianity and married Anne, sister of the Greek Emperors, Basil and Constantine, and on his return to his own country he caused his people to be baptized.

form a military caste around the prince, but would return immediately to the soil.

If one studies closely the Russian epic, he comes to the conclusion that the Russian nature, being very peaceful, always unhesitatingly, as a matter of natural duty, stands up as one man for the defense of his country and of what he thinks is right. And so it happened in this war.

A UNANIMOUS RESPONSE TO THE WAR'S CALL

From the very beginning of the present war the spirit of the Russian people, of the peasants especially (who form three-fourths of the population of Russia), was really marvelous. The rapidity with which the mobilization was carried on in Russia surprised not only the whole outside world but Russia itself. A people never responded so unanimously to a war call as they did in Russia at the time of the first mobilization.

There are times in the history of the human race when people, more by intuition than by reasoning, are able to comprehend a situation. More by intuition perhaps than by reasoning the Russian people, and particularly the peasants, understand that this war is different from other wars; that it is not only a question of mere defense of homes, towns, of wives and children, but also some great principle is at stake—a principle which means the creation of a new epoch.

ARISTOCRATS OF THE DOG WORLD

Revolutionaries may overthrow Tsarism, but in canine circles the Russian wolfhound will always be among the elect

All through our history we can see that at certain stages the mass of the population has been able to absorb ideas intuitively—ideas that perhaps have not been even clear to the most enlightened part of the country—and it was the case in the beginning of this war.

The Russian peasants, of whom everybody thinks as being ignorant and in the dark, understood the righteousness of our cause from the beginning. The activities of the peasant communities throughout Russia have proved this understanding. For example, many of the peasant communities which before the war asked for remission of taxes, being too poor to pay them, when war started would gather up their last money and come to the taxation offices in the town, there to wait upon the official and offer to pay off their taxes. When the official, surprised at such a zeal, would say:

"But no, your community is granted for three or five years remission of taxes." The peasants would shake their heads and answer: "Oh no, your honor, please accept the taxes. We want to pay them. We no more ask for the remission."

"OUR COUNTRY NEEDS HELP"

Sometimes the official, annoyed at such persistence, would order them away. They would remain in the town, sleep perhaps in the market-square, and the next day again come to the office, again bow to the official and ask him to take the taxes, and when the officials would ask them: "But why do you want to pay, if the remission is already granted?" they would say: "Oh! no, that was before the war. Now the country is in war; now the country needs money, and who would pay if the peasant does not pay?"

In many of the peasant communities they organized reading clubs for the purpose of gathering in the evenings and reading newspapers and discussing the situation. Sometimes they would have to send a man on horseback or in a wagon for 10 or 15 miles to the town to bring a newspaper. Then some young man or school boy, surrounded by all the old men and women and children of the village, would read aloud the paper, and hot discussions would take place. They knew all; they knew about Serbia; they knew about Belgium.

In one community the peasants decided to do something for the Belgians. They started to collect money and they collected a very "large" sum—29 roubles (about $14); then the community gathered at a meeting and debated as to whom this money should be sent, and they decided to send it to the King of the Belgians.

So they wrote him a letter, saying: "Dear King, Your Majesty: We, the peasants of this community, know what wrong has been done to your people. We know how they must suffer and we also know your heart is aching for your people; and so, Your Majesty, we decided to help you and your people. We send you this money; distribute it equally among your people." It is naïve; it is primitive; yet it shows the spirit of the people.

HOW THE WOMEN HELP

The women in the villages at the same time started in different ways to help those called to arms and the soldiers at the front.

The peasants possess a very good sense of organization. This has been observed all through the war. The women in the villages, for example, organize themselves into groups of seven, according to the days of the week. They work in turn to help the soldiers at the front. One woman gives up all her time one day a week, while her six neighbors do all the housework in her home for her, work in her field, and look after her children. Many similar manifestations of organization could be related.

The Russian peasant is not so ignorant as people think him to be. He is striving for education earnestly, and for the last twenty-five years, with the development of the railways, with the building up of industries in the towns where he goes to work, with the establishment of more and more schools by the "zemstvos" (county councils), the peasant has taken an increasingly important part in national life.

No one can imagine how hard it has always been for the peasant to satisfy his yearning for knowledge. Schools not being in every village, the peasant chil-

dren sometimes have to walk three and more miles, in the darkness of an early winter morning, through wind and cold and snow, to school, and trudge back to their homes in the dark at nightfall.

Sometimes the village where the school was desired was so poor that the inhabitants did not have a building for the school, but formed one in a peasant's house; in one room the peasant and his family would live and in the other room would gather some thirty or forty boys and girls for their lessons.

TEACHING REGARDED A NOBLE CALLING

Our best young men and women, for the last twenty-five years, have regarded the mission of a village teacher as an apostolic mission. These young people, the best students of our universities, leave the university, sacrifice their careers, their comforts, and go into the remotest provinces in the far-away villages of Russia to bring light, knowledge, and education to the peasants so long deprived of it.

It was indeed an apostolic mission on the part of the teacher. He would be everything to the peasant; he would not only teach the children, but the peasants, men and women, would come to him for everything they needed, for all the advice that he could give them, even on domestic questions. There were communities that could not pay the teacher at all, that would collect some small sum of money only twice a year, at Christmas and at Easter, and hand it to him.

In some villages the peasants would "feed" the teacher in turn—one day the teacher had food at one house, another day at another house. But these hardships would not depress the spirit of the teacher and his faith in his mission. When he went to the village he knew what conditions he would meet.

There were other hardships: the government officials would regard the teachers in most cases as "dangerous" men. All the good work that a teacher was doing was always hindered by some petty official. Only certain books were allowed to be read to the peasant, and only certain books, permitted by the government, could be given to the peasant to read, and if it were found out that the teacher gave other books he would be imprisoned, and even exiled to Siberia.

Many and many of these young men and women during the last twenty-five years paid with their lives for their good work. I have had personal friends who paid that price.

A YEARNING FOR KNOWLEDGE

The striving for education in Russia is really very great. The majority of our students in the universities are young men whose fathers are peasants—working men, small shopkeepers. On the whole, the people could not afford to pay for education, and the students have to go through the university by earning their own living, and even in the high schools many of the students have to earn their way from the age of twelve and thirteen.

They go to school in the morning and in the afternoon work somewhere, often doing manual labor, and at night they study. They would go practically penniless to the big university cities, having had only a handful of money to pay the expenses of the journey. Many of them would live seven or nine students in one room, sleep on the floor, and go for weeks and weeks without having what we are accustomed to call a meal.

I know cases where seven students had only four pairs of shoes among them and three or four overcoats, and they would go to the university by turn—one day one would put on shoes and overcoat and another day another student—and so they would live in the winter, studying, and studying hard, and in the summer they would go to the villages and work as laborers, to gather again just enough money to take them to the university, buy some books, and continue their education.

The university life in Russia is quite different, or at least was quite different, from the Western or American university life. No games, no sport, no societies—associations were not allowed—and all social intercourse of the students was forbidden by the government. Circles of various branches of study had to gather secretly; and yet, with all these obstacles,

Photograph from Topical Press Agency

A ROLLER-CHAIR OUTING A LA RUSSE

Instead of being trundled about in rubber-wheeled rolling chairs propelled by a minion dressed in duck, the leisure folk of Russia are whirled about in chairs equipped with runners, for which an expert skater dressed in fur furnishes the motive power; and instead of the familiar boardwalk of the American seaside resort the course of this promenade is the frozen waters of the river.

every year more and more young men from the villages and small towns came in search of an education.

A LAND OF VILLAGES

Russia is a country of villages and small towns. The life of a small town is really interesting. On the surface it is very calm; yet everybody is striving toward a different life, toward a life much broader, both materially and spiritually.

I remember one small town, about 120 miles from Nizhni Novgorod—a small town where every house was surrounded by a garden—where everything seemed calm and inactive, the streets empty; everybody just lived from day to day, quietly obeying all the rules and restrictions—orders given to them from higher up. Life seemed peaceful and that peace uninterrupted and everybody appeared content.

But that calm was only on the surface. From the first day of our arrival we began to discover quite a different condition in the town, and the character of the inhabitants became more and more disclosed to us as we lived there a few months.

One day an old priest came to the house. He said that he welcomed people of education to his neighborhood. He had heard from the men who carried our baggage from the station that we had many cases of books. Perhaps he could read the books that he had not yet read. He said there was no library in the locality and no one from whom he could borrow good books. Being a poor priest, he could not afford to buy books, or even to go to the city for them.

A PRACTICAL PRIEST

The town was situated on a river, and above the town there was a tannery. The hides were washed in this river, and the town, not having a sewage system, had to drink the same water. Of course, dis-

© Underwood & Underwood

ALL FIGHT AND NO PLAY MAKES JILL A POOR SOLDIER

Women of the heroic "Battalion of Death" wrestling to keep themselves fit for active service on the Eastern front. Inspired by the revolution, Russian girls of all classes have enlisted in the ranks of "The Battalion of Death." The wonderful story of their brave deeds on the Eastern front is already history. They fought on while the men of Russia retreated. These valiant women go into battle without the slightest fear of death, but they dread capture. Each carries a dose of cyanide of potassium to use in the event she is taken prisoner.

eases spread every summer. This priest decided to find a way for the people residing there to get good water. He knew the country well, having lived there all his life; he knew of small streams and brooks around the town, and he had an idea of connecting the various streams and brooks into one large stream and of finding means of establishing something like a primitive pipe-line to bring pure water to the town.

So he and his man-servant started to work. They were digging ditches and working on the scheme every day *for five years*. Then, finally, they succeeded in connecting some of these streams and rivers and establishing a pond of very clear and fine water. The priest went here and there trying to get the rich people to build pipes.

In the meantime he procured and studied books on hydraulics and was able to draw up quite an elaborate plan of sewage disposal for the town. He struggled eight years more. Nobody would listen to him. The rich were not interested because they could send their horses and have their water brought to them in barrels from a stream ten miles away. Only the poor people suffered. Finally, after persisting for *eighteen* years, this priest found means of getting a few thousand dollars and bringing water to the town.

All the children of this priest went to the city. His older son was a doctor in Petrograd; his eldest daughter studied medicine in the University of Moscow; one of his daughters was in the University of Lausanne, Switzerland, and the youngest in the high school in the town. The father had written two books on religion.

AN ERUDITE SHOEMAKER

There was another man in the town, a shoemaker, who lived in a suburb on the other side of the river. Once this man came to our house and announced that he was a shoemaker; perhaps we would have some work for him. Yes, work was given him; but he would not go away, and everybody saw that he wanted to tell something, which he either did not know how to tell or did not dare to tell.

Finally he said: "I heard you have many books." "Yes, what about it?" He said: "It is so nice to have many books." "Yes." "I am very fond of books." And after a pause he said: "Do you have books on astronomy?" We were all surprised. We asked him why particularly on astronomy, and he said: "Because that's what I am especially interested in." He was taken to the library and a popular pamphlet on astronomy was given him. He looked at it and said: "Oh, no; that is for children." Another book was given him—also a popular book. "Oh, that I have read long ago." Still another book was given to him, "The Astronomical Evenings of Klein." "Oh, yes; that's a fine book, but I have read it."

Then he was asked to be seated, and we questioned him: "But how is it that you, a shoemaker, have such an interest in astronomy, and where did you learn even to read?" He said: "Until I was seventeen I could not read or write. I had no schooling; there was no school in the village where I was born, but I always wanted to know things; and ever since I was a child I have wanted to know about the skies and the stars, and when I was small I decided that when I grew up I would begin to learn to read and to read something about the stars.

A COBBLER ASTRONOMER

"At the age of sixteen I came to this town and there was a student who had come from the city, the deacon's son. He stayed all summer, and I told him: 'You know so much and I know nothing,' and he taught me to read, and it was so nice to know how to read. It was like speaking constantly to a clever man, and I found that you can dispute with books as with living persons. I would read a book and then, nights I would dream about it, and if there was something I could not understand in the book and if something puzzled me, and if I couldn't agree with something written in the book, I would dispute the whole night in my dreams with the author, and I almost would hear him talking to me.

"I always tried to get the picture of the author of every book I read so that I might know his face, and his eyes, and see

Photograph by Elisabeth Randolph Shirley

TIFLIS: CAUCASUS

No other country has so many races and nationalities within compact dominions as Russia. Occupying more than half of Europe and nearly two-fifths of Asia, its sweep includes the cradle of the Aryan race to the lands where Oriental civilization appears to have had its birth. Slav, Lithuanian, Latin, Iranian, Armenian, Finn, Samoyed, Turko-Tartar, Tunguz, Mongols, Georgians, Yukaghirs, and Chukchis are all to be found living on native heath within the great republic's borders.

how he looked; and finally my dream to know about astronomy was realized, and the third year after I learned to read the same student, a good boy, in prison now, sent me the first books on astronomy, and since then," he said abruptly, "I have learned something. I went twice by foot to Nizhni Novgorod. I worked five years to collect money to buy a lens to construct a telescope, and I succeeded. I have it now on my roof, and I tell you it is wonderful!"

And the next week we visited this man, entered his simple log house where, in one room, he lived, with his wife and four children, and in another room were shelves of books and his shoemaking implements. In one corner of the house there were a few steps leading to a kind of primitive tower, where we saw a not less primitive telescope.

In every town where I went I always found people of that kind, not having means to educate themselves—the government not only not providing them means of education, but hindering in every way—yet they were striving, suffering, and persisting in their strivings, and working and achieving things that would seem almost impossible, under the circumstances, to achieve.

Russians in general read a great deal. They love books, and the average Russian is accustomed not only to take books from the library but to buy them for his home, to talk to his friend about the book he has just read, and always wants to share a book with some one and to discuss it, to dispute over it.

RUSSIANS LOVE TO TALK

Speaking of "discussions" or "disputes," the following is a very characteristic trait among Russians: When a man invites you to have tea with him in the afternoon, he writes you a note, saying: "Please come and have a cup of tea with me; we are going to dispute."

It has many times been observed by foreigners who come in contact with the

Russian intellectuals that they talk too much. This is true; they do talk too much. Perhaps it can be explained by the fact that for years and years they have not been allowed to act, and therefore all their energies were devoted to talking, which served as an outlet to their accumulated knowledge, so to speak. But this talking has in itself brought about very good results—that is, people were enabled to formulate more precisely their ideas about things—and when favorable time for action came then they were able to put their words in action.

Many of the foreign authors are just as well known in Russia as in their native country. It would take too long to relate all the translations, so I will confine myself, as it may interest the American people, to a few American authors who are known to the Russian people as well as to the Americans. Mark Twain is, of course, as much a Russian author as an American author. Everything that he has written has been translated into Russian and therefore has been widely read.

LONGFELLOW AND MARK TWAIN BELOVED IN RUSSIA

Longfellow is just as well known, perhaps, as Mark Twain. His poems have been translated into Russian, not in prose but in the same form as written, even the rhyme and the rhythm of the verses having been preserved.

A well-known Russian poet, Ivan Bounin, translated "The Song of Hiawatha," and if one reads a stanza in English and then in Russian, he will see that the rhyme and rhythm have not been changed by the translation, but are the same. This is true also of Edgar Allan Poe's writings. His poems were translated by another famous Russian poet, Constantine Balmont, and not only his poems but all his short stories also have been translated into Russian, and his works are very much appreciated and loved.

Walt Whitman's complete works have been translated; William Dean Howells is as well known in Russia as in America. In 1907 Jack London's complete works were translated; they appear in twelve volumes in Russian and have had a tremendous success, the edition having been repeated six times in one year. The essays of Emerson are widely read; the books of William James, especially his "Principles of Psychology," are known to every intelligent Russian.

The lives of many Presidents of the United States have been translated into Russian and their histories are familiar to the mass of the Russian people. The "Life of Washington," the "Life of Garfield," "From the Log Cabin to the White House," etc., are known by everybody in Russia who reads, and I need not add that "Uncle Tom's Cabin" is known to all Russians, not only by those who read.

In Russia books are published in editions not of one thousand or five thousand copies, but in editions of ten and twenty thousand, and if an edition is repeated, a book often has a sale of about 80,000 copies a year.

The Russian youth begins to read very early. I remember that when I was fourteen years af age we had circles for the purpose of self-education, and we studied economic questions—sociology; and when I was fifteen and sixteen we studied in our circles philosophy—Kant, Schopenhauer, Fichte, Hegel, and the French Humanists.

It sounds rather "abnormal" for "persons" of that age to be occupied with such questions, and some may have doubts as to the seriousness of our readings, but I have never felt myself so grown up and so able to understand things clearly as then. . . . It may be that the Russian youth in those days—fifteen or twenty years ago—felt intuitively that he had a great responsibility toward his country and that upon the youth of twenty years ago would fall the great task of reorganizing his country and bringing her institutions to the level of other democratic nations.

FIFTY MILLION COÖPERATIVES

The coöperative movement in Russia was a great help to the education of the rural districts. It celebrated its jubilee in 1915, the first coöperative society having been sanctioned in 1865, during the great reforms, when the serfs were freed, and

Photograph by Walter L. Beasley

A BACK VIEW OF A RICH YAKUT GIRL'S COSTUME, SHOWING WIDE BAND OF FINE SILVER-WORK: SIBERIA

when the Zemstvos—local self-government—were introduced.

In the first forty years the progress made was slow. It is during the last ten years that the success of the coöperative societies has been specially marked, so that today the movement, with a membership of 11,299,404, has reached a position which is claimed to be far ahead of that of all the countries of western Europe.

The number of people in Russia directly touched by the movement must be between 40 to 50 millions, or about one-third of the population.

The grouping of the various coöperative societies into unions was for a long time opposed by the government—the first union having been sanctioned in 1901. But it was not until 1911 that these unions received powers to carry out their natural financial operations. In that year the Moscow Peoples' Bank was formed, with 1,327 credit societies as the shareholders. This bank has since become the most important organization for financing agricultural machinery purchases, for the sale of agricultural produce, and of the cottage and Kustarny manufactures.

Other important unions are the Ekaterinburg unions (74 societies), in the Urals, and the Siberian Union of Butter "artels" (318 artels in 1912). The turnover of this union in 1914 was 14,000,000 roubles. In other branches coöperative societies have been formed for the purchase and distribution of agricultural machinery and implements.

Attempts have also been made to organize the collection, transportation, and sale of fruit, vegetables, and eggs on a coöperative basis. In South Russia there are several coöperative flour mills, and a number of societies have been formed for the construction of country grain-elevators; the largest elevators are being provided by the government.

COÖPERATION'S GREAT INFLUENCE

The influence of the coöperative movement and of its phenomenal development is being felt in every part of Russia. That it will ultimately modify profoundly the conditions of life, the business habits of the peasantry in a progressive modern sense, is beyond question. Especially will this be so when a liberal measure of national education is introduced to emphasize and add to the moral effect which coöperation is known to exert upon those who practice its principles.

The Russian peasant, both by temperament and by habit, responds naturally to coöperative effort, and it is here that his genius finds self-expression. The pres-

ent time is a unique opportunity for its spread, when the renunciation of the vodka habit is leaving the peasant with financial resources on a scale hitherto undreamed of by him.

The coöperative societies have opened many schools, not only elementary schools in the villages, but they have in many Russian towns established professional schools—agronomical schools for teaching the peasants intensive farming. They also helped to establish schools of technology, libraries, etc.

A UNIVERSITY WITH 7,000 STUDENTS

During the last fifteen or twenty years there has been a growth of so-called popular, or free, universities, with evening courses for those who work during the day. A popular university of this nature was endowed by a rich man in Moscow, Scheniavsky, about ten years ago. It started in a small building and had a limited program of study.

A few years later the affluence of those who desired to attend the university was so great that the Moscow people decided to extend the activities of the institution, and later a magnificent building was specially constructed for the purpose. Now the institution is attended by more than 7,000 students at the day and evening courses, with more and more branches being added to its course of study.

Russia has given to the world great men in every branch of human thought. In literature our folklore is one of the richest in the world. Our modern literature dates from the eighteenth century. Lomonosov by his work on the Russian language paved the way for style and composition. He was a fisherman's son, from a northern district of Kholmogory, of the province of Arkhangelsk.

His father often took him to far-off towns, and from his early boyhood he had access to books and had a great desire for knowledge which he could not satisfy in his native town, and when seventeen years of age he stole away with a caravan of peasants going to Moscow, and there he started his new life. He was a man of great learning, and the University of Moscow, in 1755, was founded under his influence. He is called the father of Russian literature.

The names of Pushkin, of Lermontov, Gogol, Turgueniev, Dostoyevsky, Gorky, and Tolstoi are known to the whole world.

From the second half of the nineteenth century Russian music has had world prominence. Glinka, Dargomijski, Tschaikovsky, Moussorgsky, Borodin, Rimsky-Korsakov, Rachmaninov, Glazunov, Stravinsky, and Skryabin are known to every lover of music in the whole world.

Our painters are not so well known to the world, but a few of them have world-wide fame, such as Repin, Serov, Vasnetzov, Vereshtchagin, and Aivazovsky.

FAMOUS RUSSIAN SCIENTISTS

In science, mathematics, the two names which stand highest are those of Lobachevskuy and Minkovsky. These two investigators illustrate the type of bold originality which marks the Russian intellect. The former was the discoverer of the new non-Euclidean geometry, which has revolutionized science. Besides these important names, among many others in the science of mathematics is that of Imsheretsky, who did work on differential equations in regions previously untouched in western Europe.

In physical science Lebedev is a physicist of the first rank to whom we owe the detection, by means of most difficult and ingenious experiments, of the minute pressure exerted by light upon a reflecting surface.

The works of Egorov on spectroscopy, the works of Umov on light—to mention but two of the names of Russian workers—show with what vigor the science of physics is being pursued.

In astronomy Russia has taken an important place ever since Peter the Great built the observatory at Petrograd. The most famous Russian men in astronomical science and research were Glasenapp and Kovalsky on double stars and Belopolsky in spectroscopic analysis.

Geographical explorations and research have been pursued actively in Russia since the seventeenth century. The Russian Imperial Geographical Society was founded in 1845, and has established

© Underwood & Underwood

Russians, both soldiers and civilians, crowding close to a railroad car to get a peek at the members of the American Mission arriving in Moscow

branches in all of the outlying parts of the Empire.

Among chemists one of the greatest names in modern times is Mendeléjeff. By the publication of his well-known periodic law of the elements he changed the whole current of thought in the chemical world.

In biological science the Russians have acquired a leading position in many branches; among zoologists Kovalevsky's work, with that of Metchnikoff, Salensky, Korotnev, and others, find their place in every zoölogical text-book.

In physiology Russia has one of the greatest of living authorities—Pavlov—who was one of the earliest to receive the Nobel Prize.

When, a few years ago, I visited Canada I discovered in the city of Toronto two students of the university who were studying hard at the Russian language, preparing themselves to enter the Petrograd University to study under Pavlov.

In branches of philosophy and sociology the Russians have made very important contributions. In psychology the researches of Bekhterev, among others, have received wide recognition. The Russian names which stand highest in this field are Solovyev, Lavrov, and Mikhailovsky.

UNDERSTANDING OTHER NATIONS

Plechanov has a European reputation as a writer on sociology. Chuprov, Struve, and Tugan-Baranovsky are among the names familiar to every economic student; and there are others and many of them.

We know so little about one another. Even in our private, personal life we do not give much attention to our friends, and we are always rather inclined to underestimate a person than to overestimate him. We more easily find fault in others than merit, and this attitude of mind is still more true in our attitude toward other nations.

We do not come into close contact with other nations. We do not know the soul of other nations. Many people have lived in France and seemed to know France, yet when the trying days came to her, did the world know her people? They exclaimed, "But it is a new France!"

No, it is no more a new France than a new Russia. It seems new because the people did not know the natural spiritual resources that France possessed, and still less do people know about Russia; and Russia, coming into the family of free-governed nations, Russia finally being able to express openly to the world the thought of her people, will add to the security of humanity against any evil and intrigue; and a free Russia, by her development, will never become a menace to other nations, because the character of the Russian people is most pacific.

Russia is for liberty, Russia is for brotherhood, Russia is for the good of the world, and the Russian people are ready to endure in this terrible war still greater sacrifices that they, in common with our Allies and with our new great ally, the United States of America, may establish in the world righteousness, truth, and liberty.

A wonderful life confronts us. We have to be thankful to God to live in such a time where life offers for every man and woman wonderful opportunities to live and to die for a great cause.

REMOVING MUD FROM THE SECONDARY SETTLING BASINS AT THE STORAGE RESERVOIRS OF THE LEAVENWORTH WATER COMPANY

When the U. S. Public Health Service took over the sanitation of the country situated in the immediate proximity of Fort Leavenworth, they found that the city water plant, which furnished water both to the fort and the city of Leavenworth, needed overhauling. This picture shows the work of removing mud from the secondary settling basins and scrubbing the sides and bottom with water at high pressure at the storage reservoirs of the Leavenworth Water Company. The men in uniform are soldiers on guard duty from the fort and officials from the U. S. Public Health Service. The latter are supervising the operation. The fine mud in the Missouri River water is probably the most difficult to remove of all the rivers in the United States.

CONSERVING THE NATION'S MAN POWER

Disease Weakens Armies, Cripples Industry, Reduces Production. How the Government is Sanitating the Civil Zones Around Cantonment Areas. A Nation-wide Campaign for Health

By Rupert Blue

Surgeon General, U. S. Public Health Service

IN SPITE of the remarkable advances which man has made in the creation of devices for the taking of human life, in spite of the wanton man-wastage of the past three years, it has been apparent from the beginning that the vital factor in the winning of this war is man power. Therefore, hand in hand with the plans for human slaughter, operations have been put in force for human conservation.

Long before the entry of our country into the war, those who were giving thought to the matter realized that, should the United States be forced into the conflict, it would be necessary to encompass not only the fighting man with every health safeguard which modern science has devised, but, what was perhaps even more important, that it was absolutely essential to maintain at the highest state of efficiency the health of the farmer, the industrial operative, the transportation employee, and all the rest of the general public upon whom the soldier must rely for food, clothing, and weapons.

If the soldier and the sailor are to be kept well, the civilian with whom they come in contact must not be permitted to have a communicable disease, and the civil environment which the fighting man enters in search of recreation must be kept in a clean and wholesome condition.

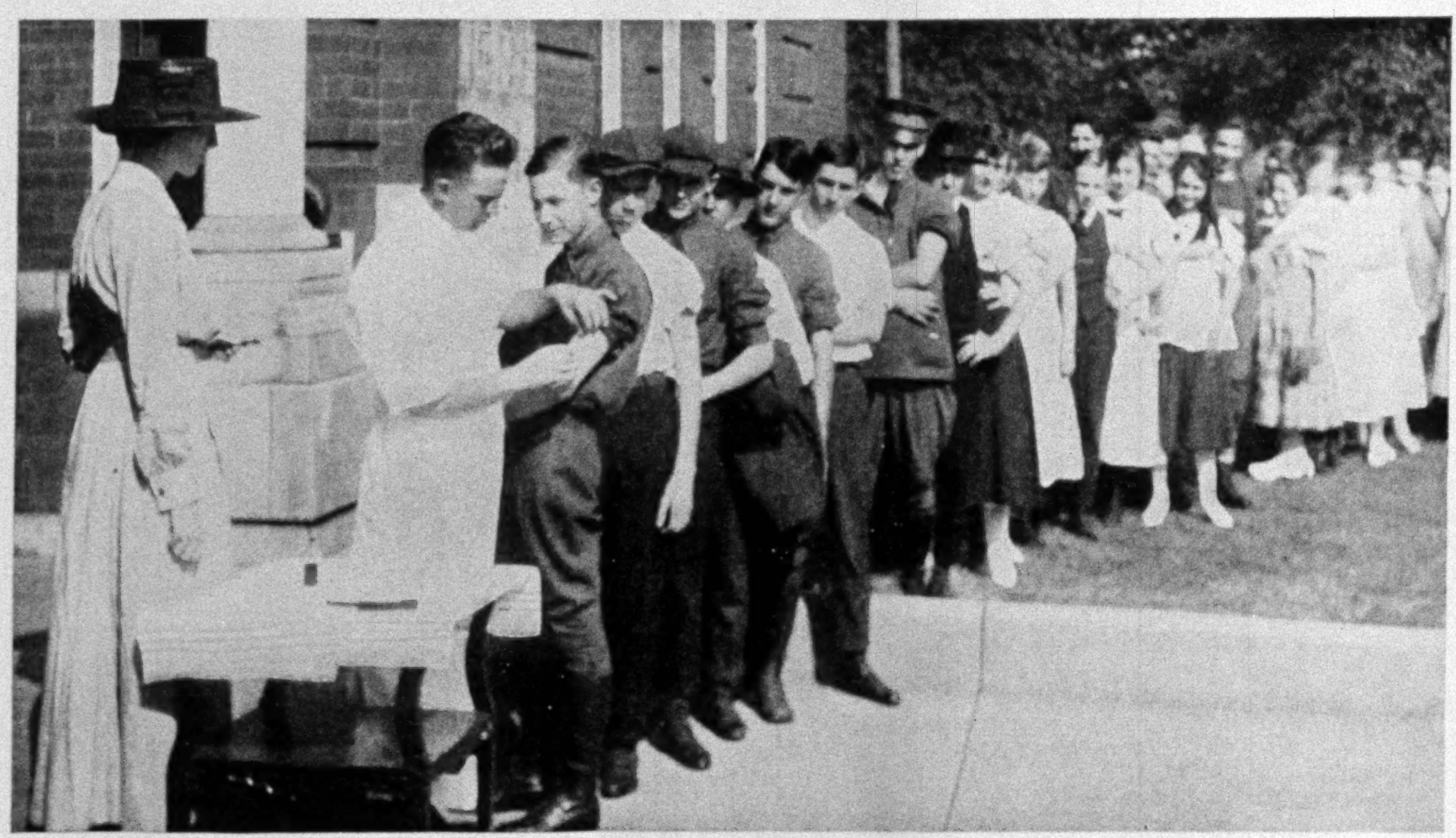
The problem naturally divided itself into two sets of responsibilities: First, those devolving upon the strictly military authorities. This comprehended all those measures which would be exercised by medico-military and line officers, for the reduction of the health hazards of the combatant forces. Their food, drinking water, clothing, and environment, whether afloat or ashore, required careful attention; the disposal of waste, the destruction of noxious insects, the maintenance of bodily cleanliness, the sanitation of the zone over which the military exercised jurisdiction—these were the duties devolving upon the medical departments of the army and the navy.

The second set of responsibilities rested upon the shoulders of the health wardens of the general public. The U. S. Public Health Service and the health organizations of the States, the municipalities, and the counties, working in coöperation and by the utilization of all the forces at their command, had to perform a similar function for the civilian population, but over much larger areas and without the advantage of the stern authority of military discipline.

Rural communities, which for generations had employed only the most rudimentary methods of excrement disposal, had to be led into the paths of sanitary righteousness; areas whose names were a local byword for malaria had to be rendered free of mosquitoes; the water supply, sewage disposal apparatus, and scavenging systems of large cities had to be put in an efficient state.

THE PRELIMINARY SURVEY

As soon as the entry of America into the war became imminent, a plan of operation was laid before the Secretary of the Treasury, the Hon. W. G. McAdoo, the nation's health representative in the Cabinet, and received his approval. When



THE SUPERVISION OF THE SANITATION OF THE COUNTRY ROUND ABOUT FORT LEAVENWORTH INVOLVED FIGHTING A VERY SEVERE TYPHOID EPIDEMIC

Over 200 cases occurred in Leavenworth city and county during the spring and summer. One week in August 26 cases were reported in the city of Leavenworth alone. This long line of high-school boys and girls are waiting to receive their vaccination against typhoid fever. The U. S. Public Health Service undertook the free administration of vaccine to all applicants. Local physicians volunteered in the work. Over 4,000 persons were vaccinated in this way during the last week in August and the first two weeks in September.

the War Department had made available the list of places at which troops would be congregated for training, steps were immediately taken to determine the sanitary conditions existing in the zones around the cantonments.

The sanitary work which is now being carried on would have been necessary, no matter what locations were chosen for the cantonments. Unfortunately, public education in the protection of health has not become sufficiently wide-spread for the Secretaries of War and of the Navy to have chosen situations in which active sanitary work would not have been needed.

In the descriptions of insanitary conditions which follow, the reader should bear in mind that their existence is not a reflection upon those having charge of the location of the camps, but rather on our people as a whole, who still need much public health enlightenment.

CONDITIONS CRYING FOR REMEDY

This need is not confined to any one section of our country. For example, in one of the Northern cantonment areas, located in one of the richest and most thickly populated States in the Union, the report of the preliminary survey showed that the city was absolutely unprepared to house the increase in laboring population during the construction period of the cantonment. The city had no building code. When the hordes of workmen began coming into town many of the people began taking roomers, and the poorer portion of the city became overcrowded; men were quartered in lofts; in some instances there were two or three men in a bed and several beds in a room; bathing facilities were entirely lacking or inadequate; ventilation was notably absent. The jail was so overcrowded that frequently four men were placed in a single cell.

There was only one public convenience station in the city. This was so revoltingly insanitary as to disgust any decent person. As a result, extensive soil pollution of the streets and alleys took place, and it was no uncommon practice for strangers to seek admittance to private homes for the purpose of utilizing their toilet facilities. The toilets in saloons were grossly dirty; the toilets at the railroad stations were reported to be inadequate, foul-smelling, infested with flies, and horribly dirty.

Only 40 per cent of the houses in the city had sewer connections. Open privies in the vicinity of wells abounded. Garbage was placed in open boxes and old lard cans. Manure bins were generally floorless, almost always open to flies, and contained a liberal admixture of household refuse, tin cans, and kitchen garbage.

The milk ordinances were not enforced; milk for the most part was produced in insanitary dairies, and the city did not require pasteurization prior to sale. Fruit and food stands were not adequately protected from flies.

In the soda-water stands and ice-cream parlors which grew up like mushrooms just outside the cantonment there was an entire absence of screening and practically no toilet facilities. There were no means for washing glasses.

Both in the city and the rural districts surrounding it, the health administration lacked personnel and funds, and was inadequate to meet the ordinary needs of the community, let alone the extraordinary conditions produced by the presence of the cantonment.

To quote another instance: In a Southern city, located in an extra-cantonment zone, the health department consisted of a part time unsalaried city health officer and one sanitary inspector who received $85 per month. The total annual appropriation for civic health activities was $4,500, of which $3,400 was expended for teams and drivers for the removal of garbage and night soil.

TWO CARLOADS OF GARBAGE CANS NEEDED

Only 47 per cent of the population was supplied with city water. The city sewage emptied into a small creek within the corporate limits and one mile from the heart of the city. Sixty-six per cent of the population used surface privies, in the inspection of 1,200 of which, not one was found in a sanitary condition. The garbage collection was insanitary and infrequent, and garbage cans were so little used that within the first month of

A GROUP OF PERSONS NEAR MARCHE, PULASKI COUNTY, ARKANSAS, ABOUT FIVE MILES FROM CAMP PIKE, ASSEMBLED TO RECEIVE THEIR THIRD DOSE OF ANTI-TYPHOID VACCINE AND VACCINATION AGAINST SMALLPOX

Practically all of the persons shown in this photograph are Poles and do not speak English. The Catholic priest of the community, shown in the left foreground, has been of great assistance to the physicians in their work in this community, he explaining to the people the object of the work. Groups of this size assembled for vaccination are an every-day occurrence in the rural work.

A CLOSE-UP VIEW OF THE VACCINATING OPERATIONS; ALSO SHOWING ONE OF THE EIGHT CARS USED BY THE SERVICE

The priest on the front seat is recording the names of those vaccinated. Scientific Assistant R. E. Porter is standing, administering anti-typhoid vaccine. Dr. R. P. Harris, sitting at the table, is vaccinating a boy against smallpox. Note the area covered with iodine on the arms of the boys in line waiting for their typhoid vaccination.

the campaign, at this point, two carloads were sold to property-owners.

The milk supply was obtained from ten small, grossly insanitary dairies, located in the city itself or in its immediate outskirts. All the ice-cream was manufactured under dangerously insanitary conditions. There was no inspection, supervision, or regulation of the city's single abattoir. Stables were conducted in the heart of the city without restriction. Mosquito-breeding flourished. Malaria, typhoid, and dysentery were of common occurrence.

These are only two examples chosen at random. They are capable of endless repetition.

Lest the reader take alarm at the thought of troops being quartered in proximity to conditions such as are described above, it may be stated that already in these two situations there has been a marked improvement, and many of the insanitary conditions have been entirely corrected.

The first step was to make rapid preliminary surveys in each area to determine existing conditions, the additional measures and organization which would be required to exercise adequate sanitary control, and the extent to which State and local resources were available to accomplish this. For this purpose survey parties, consisting of commissioned medical officers, sanitary engineers, epidemiologists, and scientific assistants, were hastily thrown into the field.

THOUSANDS OF SQUARE MILES UNDER SANITARY SURVEY

The magnitude of this single operation may be sensed when it is realized that for the army alone there are sixteen National Army cantonments and sixteen National Guard camps, in addition to many military zones in which smaller

GIVING THE ANTI-TYPHOID INOCULATION IN A DISTRICT SURROUNDING A CANTONMENT

A case of typhoid fever is now existing in one of these families. The Public Health Service officer and Red Cross nurse are vaccinating the other members in order to limit the spread of the disease, if possible. In addition to the typhoid prophylaxis thus depicted, the house and premises have been put in a sanitary condition.

bodies of troops are to be collected, and that in each instance these surveys, of necessity, covered several hundred square miles.

When it is taken into consideration that in these locations cities having a military population of from 40,000 to 80,000 men have been rapidly created in a few weeks; that the inhabitants of these new-raised cities have been brought from every corner of the Union, and that many of them, in spite of the utmost precautions, carry in their bodies the causal agents of disease, and that existing towns near cantonments suddenly receive a large influx of artisans, laborers, and their families, and those who inevitably follow in the train of armies, it is seen that the potentialities of the sanitary situation were very grave. In the aggregate the amount of work which had to be done to meet the requirements of these conditions was stupendous.

Immediately upon the arrival of the sanitary survey party upon the scene, accurate information was obtained as to the purity of the public water supply, the efficiency of the sewage system and the scavenger service, the safety of the milk and other foods sold to the general public, the thoroughness of the prevention of communicable disease, the presence of disease-bearing insects, and the general sanitary condition of the environment in contiguity to the cantonment and those areas which troops might reasonably be expected to visit. Mosquito-breeding swamps were carefully surveyed; the engineering measures coincident to their drainage, oiling, etc., were carefully considered. In the rural districts each home was visited, the purity of the well water determined, and the efficiency of household conservancy investigated.

A study was made of the State and local health machinery at hand and the extent to which local funds were available for the purpose was noted. An estimate was made of the amount of work which would be necessary to place and maintain the area in question in a good sanitary condition. The officer in charge of the survey party made definite recommendations as to the extent to which local, State, and Federal funds should be expended for the purpose, and the number and character of the personnel necessary to accomplish the desired result.

These surveys were made in cooperation with State and local health authorities, and upon their completion, if it was believed necessary, an offer was made for the conduct of further work.

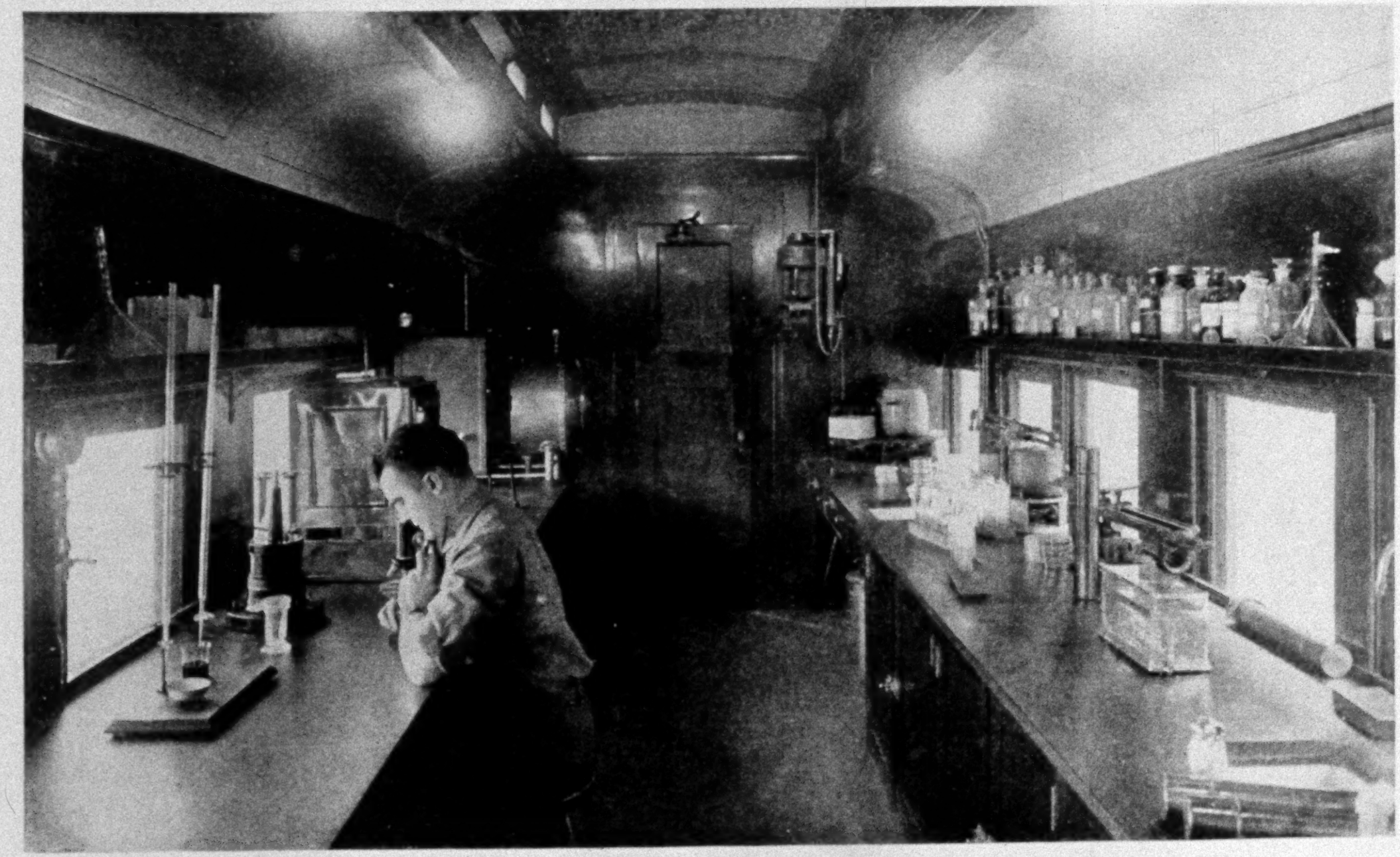
WELL EQUIPPED AND EFFICIENT STATE ORGANIZATIONS

Some of the State health departments were so well supplied with funds and have such efficient health organizations as to be able to administer the problem without assistance, and were anxious to relieve the general government of its duty in this respect. In such instances, a copy of the report of the survey was filed with them, and they continued the administration of health affairs in the extra-cantonment zone, which is visited from time to time by an officer of the Public Health Service in order to observe the progress of the work in hand, and to cooperate in an advisory capacity should it be necessary.

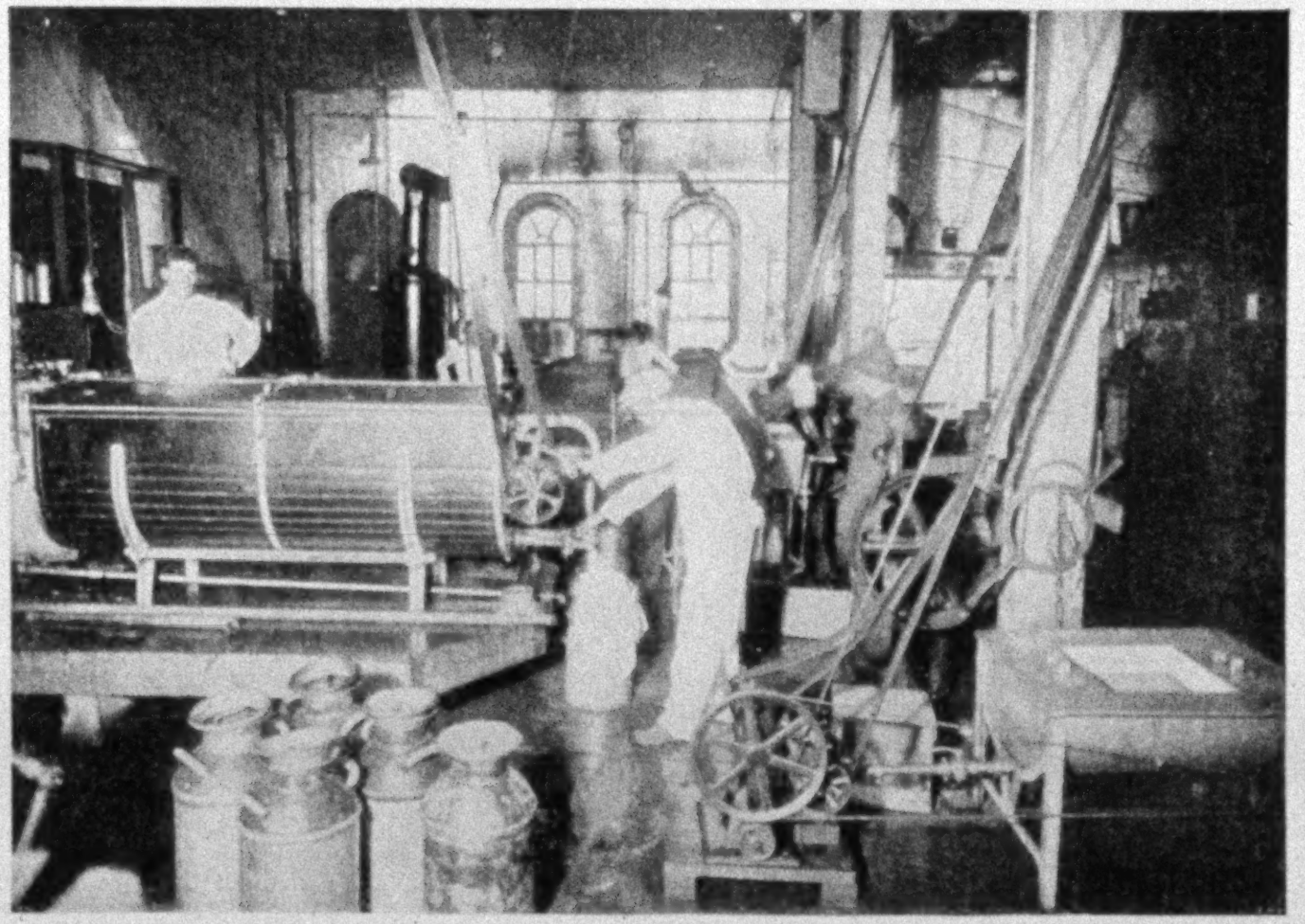
In other zones the States were able and willing to carry on the work, but desired the assistance of experts in meeting special problems. In such an instance an officer was left permanently in the zone in an advisory capacity.

In the great majority of situations, however, the health authorities felt that it was a proper function of the general government to carry on the work, that by such a plan nation-wide uniformity of action would be secured, and the financial burden borne by the country as a whole, which is responsible in large part for the necessity for added sanitary labor. In this connection it may be pointed out that practically none of the State legislatures were in session, and that they had already made appropriations which they believed adequate to meet the ordinary sanitary needs of their respective States. In such a situation the State Board of Health, no matter how efficient and highly organized, was without means of meeting the extraordinary conditions which have been created.

In these places, upon the request of the State and local authorities, an officer of



INTERIOR VIEW OF ONE OF THE LABORATORY CARS OF THE U. S. PUBLIC HEALTH SERVICE



AT LEAVENWORTH THERE WERE MANY SOURCES OF THE TYPHOID FEVER EPIDEMIC; ONE OF THE MOST POTENT OF THESE WAS THE MILK AND ICE-CREAM SUPPLIES

This picture shows the dairy inspector and an official of the U. S. Public Health Service in the act of taking a sample of cream from one of the largest ice-cream factories in the city.

the Public Health Service was detailed in charge of the extra-cantonment zone. Most of the States requesting this co-operation created in the extra-cantonment zone a civil sanitary district, and delegated to the representative of the Public Health Service sanitary police power in that area.

THE AREAS AROUND THE CAMPS UNDER PUBLIC HEALTH SERVICE CONTROL

At the time of writing this article the following National Army extra-cantonment zones have been surveyed and turned over to the administrative control of the Public Health Service: Camp Lee, Petersburg, Va.; Camp Jackson, Columbia, S. C.; Camp Gordon, Atlanta, Ga.; Camp Pike, Little Rock, Ark.; Camp Zachary Taylor, Louisville, Ky.; Camp Dodge, Des Moines, Iowa; Camp Funston, Fort Riley, Kans.; Camp Lewis, American Lake, Wash.; Camp Sherman, Chillicothe, Ohio, and Camp Travis, Fort Sam Houston, Tex. The following National Guard camps have been surveyed and turned over to the administrative control of the Public Health Service: Camp Greene, Charlotte, N. C.; Camp Wadsworth, Spartanburg, S. C.; Camp McClellan, Anniston, Ala.; Camp Sevier, Greenville, S. C.; Camp Wheeler, Macon, Ga.; Camp Sheridan, Montgomery, Ala.; Camp Shelby, Hattiesburg, Miss.; Camp McArthur, Waco, Tex.; Camp Logan, Houston, Tex.; Camp Bowie, Fort Worth, Tex.; Camp Beauregard, Alexandria, La., and Camp Hancock, Augusta, Ga.

In addition, similar arrangements have been made at Leavenworth, Kans., at which exists Fort Leavenworth, a large army post; Chattanooga, Tenn., near which Fort Oglethorpe is situated, and in Elizabeth City and Warwick counties, Virginia, lying between the York and the James rivers. The last named situation is one of great military importance, because of its relation to the army, the navy, and the large ship-building indus-

tries. It was considered very essential that extraordinary measures be taken for the health protection of this zone.

The mode of procedure and the operations which have been carried out in the vicinity of Little Rock, Ark., may be considered as fairly exemplifying all of the work, but each of the cantonment zones presents an individual problem.

WORK AROUND CAMP PIKE, LITTLE ROCK, ARKANSAS

The site selected for the National Army cantonment at Little Rock, Ark., comprises a tract of some three thousand acres, about four miles north of Little Rock, on the opposite side of the Arkansas River. The camp is situated on a plateau about 500 feet above sea-level, and approximately 200 feet above the river plane. About one-half a mile away is the city of Argenta. In addition to the area set aside for the cantonment proper, ten thousand acres to the northward of the cantonment have been designated as a training ground. The surrounding country is rolling, partly open, partly wooded; the soil consisting of surface soil, clay, and gravel, with some small boulders upon a sandstone bedrock. In places the land is low and marshy. Three civil divisions are included in the sanitary district: the city of Little Rock, the city of Argenta, and a portion of Pulaski County.

A SEVENTY SQUARE-MILE BATTLEFIELD IN A MOSQUITO WAR

The major sanitary problems in the district were the eradication of malaria and the effective control of the other communicable diseases. The former required for its accomplishment the extermination of Anopheles mosquitoes in the whole area, particular attention being paid to mosquito-breeding within the range of mosquito flight from the camp. In addition, it was necessary to supplement these measures with the control of the infected and the infectible civilian population in the district; in other words, to break the chain of malaria infection by the control of the disease-carrying insect on the one hand, and the killing of the malaria parasite in the infected human being on the other.

The territory which had to be rendered mosquito-free covered about seventy square miles, in all of which were numerous and prolific breeding places for the Anopheles. Though the country was naturally well drained by water-courses of ample fall, considerable difficulty was anticipated in the proper channeling of these streams by reason of the rocky character of their beds. The great obstacle, however, was the matter of time, since only about two months were to elapse between the beginning of the work and the occupation of the cantonment. The control of the other infectious diseases required close sanitary supervision of the entire area and its population by an efficient health organization.

Since three civil divisions were involved, the question naturally arose as to whether there should be three health bodies or one central, consolidated organization administering the entire sanitary district.

Early in June the sanitary survey was completed. The report covered the water supply, the sewage system, the public health administration, the collection of mortality and health statistics, and the prevention of the communicable diseases, not only for the cities of Little Rock and Argenta, but for the surrounding rural area in Pulaski County as well.

It was necessary to drain mosquito-breeding pools, channel water-courses, and eliminate, by filling or otherwise, many places not capable of such treatment, or, if this was not possible, to destroy the larvæ by careful oiling at least once in every seven days during the mosquito-breeding season. Every case of malarial fever had to be recognized promptly and reported, screened, and treated; and the general public, by educational measures, had to be induced to screen their houses and porches, and, where necessary, to take quinine in small doses at regular intervals.

CLEANING OUT DISEASE

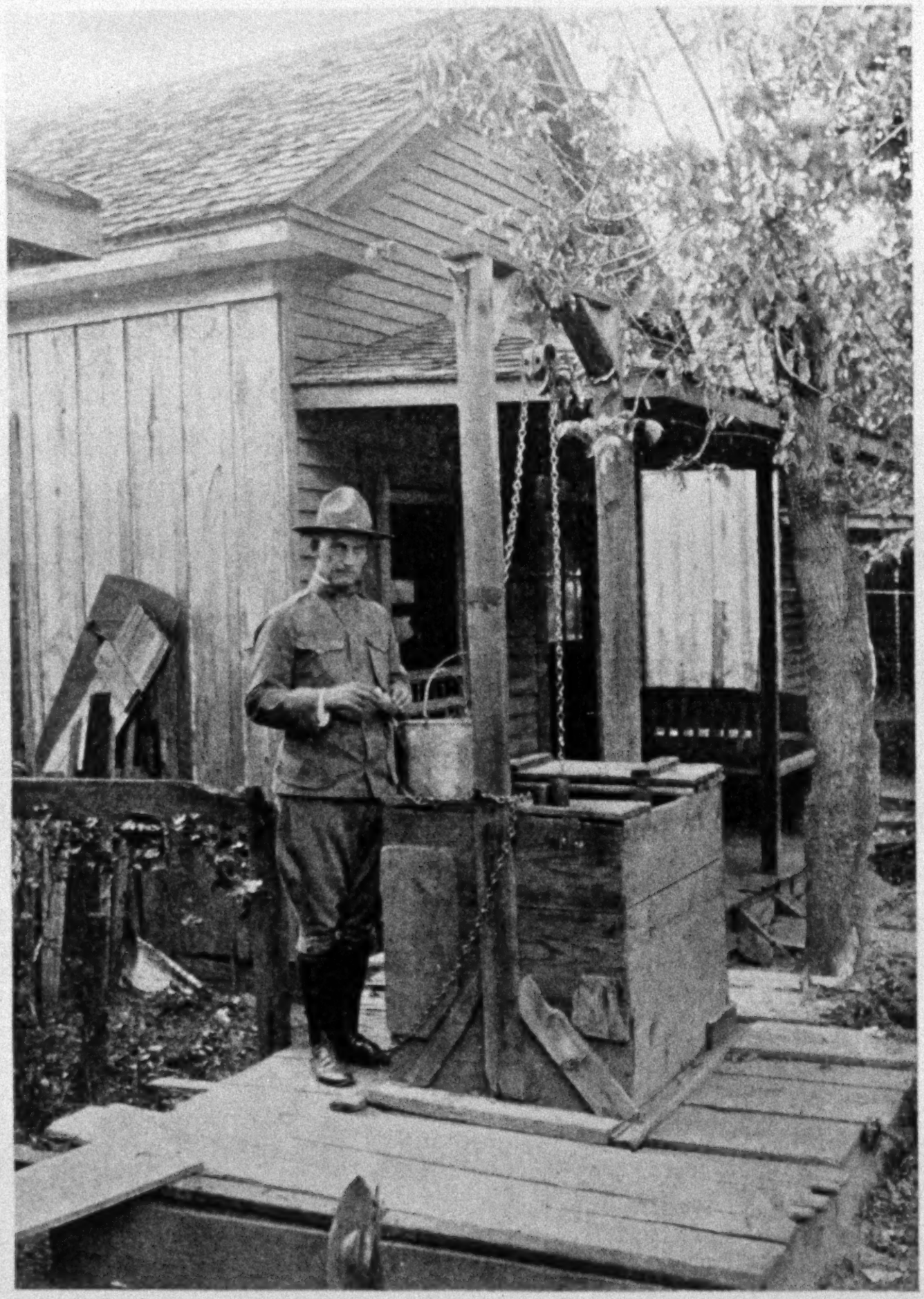
In Little Rock and Argenta the condemnation of unsafe wells and springs and the substitution of the public water supply was necessary. There were over 5,000 open, insanitary privies in the two

TALKING IT OVER

This picture shows an officer of the Public Health Service in the act of explaining to one of the residents of an extra cantonment zone the necessity of putting his premises into a sanitary condition. The art lies in making the people themselves actually want to do the work recommended. Much better results can be obtained in this way than are possible by perfunctorily ordering them to do it.

cities to be discarded and replaced by modern sanitary conveniences. Data had to be collected regarding all cases of communicable disease; adequate diagnostic laboratories to be installed, and complete epidemiological studies made in each case of reported illness. Isolation, disinfection, and the institution of prompt prophylactic measures against epidemics; the frequent inspection and rigid supervision of food supplies, especially milk, cream, and ice-cream, and of all places where food was sold; the pasteurization of the milk supply; the scoring of dairies; the careful inspection of each rural home and the education of the general public for the purpose of engaging its assistance in this mighty task—these were but a few of the activities the necessity for which was pointed out in the report.

On the 27th of June a sanitary officer of wide experience took charge of the work in an advisory capacity. The following day the local authorities made a



TAKING A SAMPLE OF WATER FROM AN INSANITARY WELL IN THE CITY LIMITS

There are 2,491 wells in the city of Little Rock, the water from which must be examined before they can be officially condemned and closed by the Board of Health. Epidemiologist J. C. Geiger, U. S. Public Health Service, is shown in this picture, with a water-sample bottle, ready to collect water for bacteriological examination. The two small cylinders in the right foreground on top of the well curb are the metallic cases for the water-sample bottle.

formal request that the Surgeon General of the U. S. Public Health Service establish administrative jurisdiction over all the sanitary work in the extra-cantonment zone surrounding Camp Pike. The Governor, the State health officer, the mayor of Little Rock, the mayor of Argenta, the county judge, and the Little Rock Board of Commerce sent individual requests for this service.

PATRIOTIC STATE OFFICIALS

It speaks well for the intelligence of this community that in a time of national stress it should so willingly and logically lay aside all questions of State sovereignty and local control, and place the burden of responsibility where it belongs—upon the shoulders of the general government.

That they were not actuated by an inability or unwillingness to expend local funds will be shown in a moment. The city of Little Rock immediately pledged $3,000 for beginning work within its jurisdiction, and a few days later, feeling that its contribution was insufficient, raised the sum to $22,000. The Little Rock Chamber of Commerce, actuated by a fine sense of its responsibility to the community, voted $50,000 for the prosecution of sanitary work, and in announcing this allotment of funds stated: "This organization wants to go on record as being heartily in accord, and will lend its financial support, in making this campaign a success, and we hereby tender our coöperation along these lines."

The city of Argenta, a town of about 16,000 inhabitants, not to be outdone, appropriated $3,000 for the first six months' work. The way in which the officials of the community recognized their duty is reflected in a letter from the Hon. Lee Miles, the county judge: "I am sorry that I have been in no position to give you some definite information. I have absolutely no appropriation out of which this money can be paid and have no money at all; . . . but I am going to raise the money some way to put up the county's part." The county appropriated $1,500.

On July 29 the Public Health Service assumed administrative charge of the zone and immediately began active operations. Coöperative arrangements were made with the sanitary officer of the cantonment proper, a large force of laborers was employed, a circular letter was mailed to every physician in the county requesting his coöperation, and in a few days the work was in full swing.

GETTING THE WORK UNDER FULL SWING

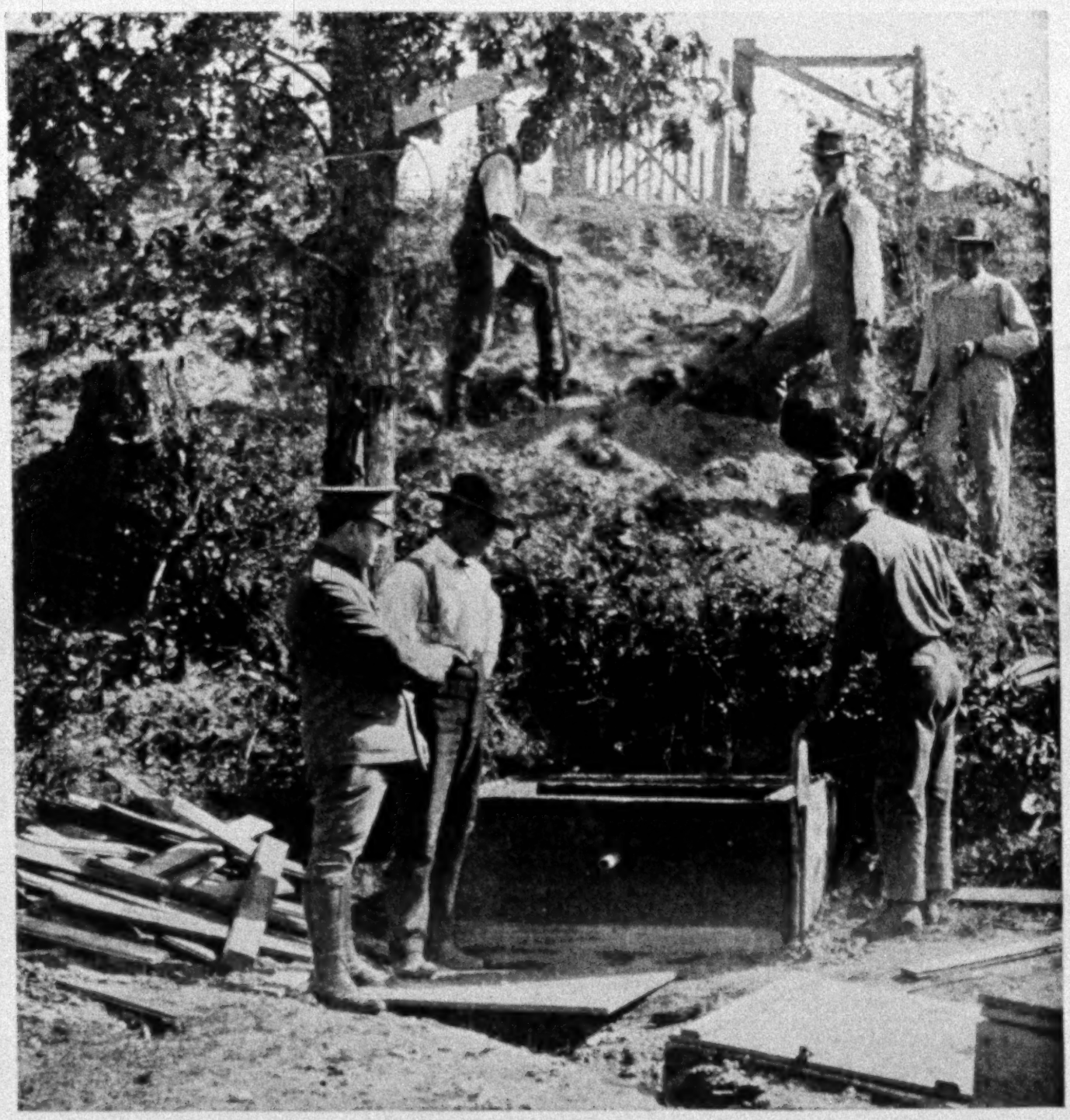
It was realized that in order that it might achieve the highest success, the project required the hearty and intelligent approval of the general public. The newspapers of Little Rock were enlisted in the cause; public addresses were delivered to the Rotary Club, the Little Rock City Council, the Argenta City Council, the Lions' Club, the Negro Chautauqua, and at the moving-picture houses throughout both cities. An exhibit was placed in a large department store on the busiest corner, showing in large models the adult and the larval forms of the mosquito.

Twenty thousand circulars of sanitary advice were printed, and one hung in every house in Pulaski County. The rental agents were asked to coöperate, and 10,000 small circulars were printed to be handed out with rent receipts and sent as inclosures with the regular mail. Free vaccination against smallpox, typhoid, and paratyphoid fever was offered to the general public.

All milk producers living in the vicinity of Little Rock were called to a meeting of the Board of Commerce. They were impressed with the urgent necessity for the proper sanitation of their dairies and the vaccination of their employees against smallpox and typhoid fever. This they agreed to do. It being discovered that the area around Carlisle, Ark., was shipping milk into the zone, a similar meeting was held there, with similar results.

A SMALLPOX EPIDEMIC STRANGLED

The erection of the cantonment caused large numbers of camps for laborers to spring up in the zone. These were inspected at regular intervals and instructions given regarding the sanitary precautions to be observed. Many of the laborers and camp followers were vacci-



PROTECTING A SPRING

In this picture are shown the methods used by the Public Health Service in preventing the water in a spring from becoming polluted by surface drainage. A concrete box has been built around the spring and the wooden forms for holding the concrete are just being removed. The concrete box will be provided with a water-tight cover. The laborers on the hill above are digging a ditch to pass surface drainage around the spring.

nated against smallpox. This was made immediately necessary by the appearance of two cases of that disease in the neighborhood of the cantonment. Large numbers of small stands for the sale of food and soft drinks were hastily put up. These were inspected, and all which were being operated in a manner dangerous to health were required to comply with sanitary regulations or cease business. The ditching and draining of the area was rapidly pushed until in many instances only a small series of pools extending to the headwaters remained. These were oiled until their contents evaporated. In other places this was not practicable and top minnows for the destruction of larvæ were planted.

Every premises in the rural district was carefully surveyed, and in each case thorough instructions were given regarding the installation of sanitary devices for human excreta. On these visits antityphoid vaccine was carried along in a

small ice-box and all persons interviewed were urged to accept free vaccination against typhoid fever. Samples were taken of the water supplies. These were subsequently examined bacteriologically, and if found to be unsafe for human consumption, the well was placarded and the owner instructed as to the manner of putting it in sanitary condition.

HOUSE-TO-HOUSE VISITATIONS

A week after the first visit the officer returned to observe what improvement had been made and to give expert advice regarding the necessary changes. At this time the second dose of anti-typhoid vaccine was given. This visit was repeated for the same purpose at the end of three weeks. The following report of the rural survey work done in Pulaski County for the week ending September 15, 1917, will give some idea of the amount of work which is being accomplished:

	Week	Total since work began
Number homes visited	265	1,405
Number public addresses	12	14
Number cards distributed	100	100
Individuals vaccinated against smallpox	442	1,810
Individuals vaccinated against typhoid	3,087	7,965
Blood specimens for malaria	54	108
Number of certificates of vaccination	337	667
Agreements signed	152	152

In the city a similar campaign was going on. Every home within the corporate limits was visited and careful records made of the condition of the premises. The yard, the cistern, the outhouses, the well, the breeding places for mosquitoes—all these received careful attention. Additional sanitary ordinances were enacted by the city council, and every means was taken to abate insanitary nuisances.

The following is a table of notices served during the month of August:

Notices Served in Little Rock During August

To fill wells	2,485
To install fly-proof privies	1,289
To install automatic flush closets connected with sewer and city water and remove privy	1,974
To close cistern	96
To install fly-proof container for manure	756
Miscellaneous notices served	297
Total	6,797

THE ACME OF PUBLIC SPIRIT

Not one person on whom these notices were served refused to comply. Four hundred and ninety-two returned their cards with the statement that the work was already started; 287 returned their cards with a request for further instructions.

The control of the milk supply was a work of considerable magnitude. The extra-cantonment area in question was supplied by 312 separate dairy farms, distributed over a zone having a radius of about 25 miles.

Upon the request of the Secretary of the Treasury, the Secretary of Agriculture detailed an expert from the Market Milk Investigation Section of the Dairy Division of the Bureau of Animal Industry to cooperate in the inspection of the dairies. The value of this assistance can scarcely be overestimated, and has already resulted in a marked improvement in the milk supply.

Mention has been made of the vaccination of dairy employees. On September 1, 683 of these had completed anti-typhoid vaccination; 176 had had two doses and 89 had had only the first dose; 587 had been vaccinated against smallpox.

Argenta is also rapidly approaching the sanitary ideal. During the month of August complete inspections and reinspections were made throughout the city and 1,230 notices were served to connect with sewers and city water. It should be remarked that in the case of trust companies and large owners of property one notice in many instances covered four or five premises. Other notices served were as follows:

To install fly-proof privies	338
To install fly-proof manure bins	384
To abolish water containers	430
To repair wells and pumps	215
To fill wells	122
To remove garbage and rubbish	232

Of the 2,067 notices served during the month of August, the majority have already been obeyed. Four hundred and fifty school children have been vaccinated against smallpox. Eighteen soda-water fountains, 8 barber shops, 2 miscellaneous food industries, 19 groceries and meat markets, 3 bakeries, confectioneries, and

CONSTRUCTION OF SANITARY PRIVY, SHOWING DOUBLE CHAMBERS AND EXIT OF DRAIN; EXTRA CANTONMENT ZONE, CAMP ZACHARY TAYLOR (SEE PAGE 277)

ice-cream factories, and 18 hotels and restaurants were inspected.

FINANCING THE WORK

It soon became evident that the funds at hand were entirely inadequate to meet the situation. Seventy-six thousand five hundred dollars was secured from local sources; the Public Health Service added $30,000. But even the $106,500 thus secured could not meet the demand for rapid, wide-spread, continuous effort. At this time the American National Red Cross, which under the terms of its federal charter is authorized to conduct sanitary operations in time of pestilence, feeling that it was its duty to assist as an emergency measure in the operations which had as their ultimate object the protection of the health of troops, came forward with an offer of assistance.

A bureau of sanitary service was created, with headquarters at Washington, and an officer of the Public Health Service placed in charge. Upon the recommendation of the Surgeon General an allotment of $6,800 was made for the extra-cantonment zone at Little Rock.

The method of procedure is for the Red Cross to form a sanitary unit, of which the Public Health Service officer in charge of the zone is the director. A local financier is chosen as the business manager, and a chief sanitary inspector, assistant inspectors, public health nurses, bacteriologists, and clerks are appointed by the director of the Red Cross bureau of sanitary service. Foremen and laborers are employed locally by the director of the unit.

Parenthetically, it may be stated that sanitary units have been formed at all of the places in which the Public Health Service is conducting extra-cantonment sanitary operations.

DAILY HEALTH BULLETINS

In order to attack an enemy, it is necessary to know where that enemy is. One of the functions of the Public Health Service is to collect data relating to the prevalence of communicable disease, in order that sanitarians throughout the United States may know what diseases to guard against. These reports are received daily from all parts of the United States, and, in addition, American consuls throughout the world keep the Public Health Service informed as to the sanitary conditions prevailing at the points at which they are stationed. This latter information is used in the operation of the maritime quarantines. Once a week this material is published in the Public Health Reports, and thus made available for immediate use.

As soon as war was declared an arrangement was made with the Surgeon General of the Army and the Surgeon General of the Navy whereby they were forwarded daily a complete résumé of the reports received by the Public Health Service. It soon became evident, however, that in the administration of the extra-cantonment zones it was necessary to establish a series of model sickness registration areas, so that prompt and effective steps might be taken to stamp ou disease among the civilian population before it had had opportunity to spread to troops or to gain a foothold in the extra-cantonment community.

Each officer in charge was, therefore, instructed to make all necessary arrangements with the physicians within his zone, to report immediately all cases of certain communicable diseases occurring in their practice. Card forms and franked envelopes were supplied them for forwarding this information. A similar arrangement was made with the undertakers to check up those cases which died without medical attendance or in which a report had not been made. A reciprocal daily interchange of information regarding the occurrence of communicable diseases in the cantonment and in the extra-cantonment zone was arranged with the sanitary officer in charge of the camp. The information received of disease occurrence among troops is regarded as confidential and is used only as a means of checking up diseases in the surrounding area.

All of the data collected in this way is summarized in a morning report and forwarded to the Public Health Service Bureau in Washington. Here it is carefully spotted on maps and collected into one daily report, copies of which are for-

XUM

RECENTLY GRADED DITCH: ANTI-MOSQUITO WORK IN THE EXTRA CANTONMENT ZONE, CAMP ZACHARY TAYLOR

One of the major sanitary problems in the camp districts has been the eradication of the malaria-bearing Anopheles mosquito within the range of mosquito flight from the camps. In addition, it has been necessary to supplement these measures with the control of the infected and the infectible civilian population.

warded to the medical departments of the army and the navy.

THE HEALTH CAVALRY MOVES

The value of this service cannot be overstated. It was reported, for example, that an epidemic of typhoid fever had broken out at a city from which 100 drafted men were about to depart to a cantonment in a neighboring State. There were about 15 new cases each day, and two cases occurred among the drafted men.

Immediately the laboratory car "Wyman," with its full complement of officers and men, was dispatched to that point. All water, supplies, ice-cream, and milk were carefully investigated. The source of the epidemic from a leaky storage reservoir was discovered, a chlorination plant was installed while repairs were being made, and the outbreak promptly snuffed out. In the meantime, the Surgeon General of the Army ordered the drafted men held until their vaccination against typhoid should have been completed. During this period it was possible to discover other infected individuals. Thus, not only were measures taken for the prevention of the introduction of typhoid fever into a cantonment, but, what is perhaps even more important, infected individuals were prevented from traveling interstate and spreading the disease among civilian communities.

In July, a typhoid fever epidemic broke out in the immediate vicinity of an army post at which some 12,000 soldiers were stationed. A survey developed the fact that the sewage disposal system in the civil community was very primitive and the water supply extremely insanitary. There was no local health code; the milk supply was uncontrolled and the scavenging system extremely bad.

Operations were immediately begun. The bad conditions obtaining at the pumping station, settling basins, and reservoirs were corrected; plans were put in force for the extension of the sewer and water mains; the food depots were put in a sanitary condition; the dairies were inspected; epidemiological investigations were made of the cases of typhoid fevor; over 4,000 people were vaccinated against the disease in the first week of operations; the medical inspection of school children was instituted, and the entire community placed upon a sanitary basis which it never knew before and which it will probably never forget.

AN ICE-CREAM PARLOR BECOMES A TYPHOID DISPENSARY

At another place, which is visited weekly by several thousand officers and enlisted men of the army, there was an explosive outbreak of typhoid fever. The death rate was high. The bulk of the cases were traced to a single ice-cream factory. Several occurred among persons who had been vaccinated against typhoid fever.

This simply meant that while these individuals were protected against the dose of typhoid bacilli which they would ordinarily receive from infected water, in this instance the dose in the ice-cream was so massive as to break down entirely the immunity which had been artificially created by the vaccination. The epidemic was immediately checked, but a campaign for better health is still being intensively waged in this zone.

The movement of large numbers of people, which was inevitably coincident to the erection and occupation of the cantonments, necessitated extraordinary precautions lest there be a spread of infectious disease through the medium of railroad trains.

On the 1st of August a letter was addressed to every railroad president in the United States, urging upon him the necessity for supplying adequate and sanitary toilet accommodations for the traveling public in the railroad stations in and around cantonments. The file of the replies received is a remarkable exposition of the genuine interest which the transportation companies take in matters of sanitary improvement.

ONLY ONE SLACKER RAILROAD

These offers of coöperation soon took tangible form in actual building operations, and, so far as is known, only one railroad refused to install the needed improvements. In this instance the Public Health officer in charge of the extra-cantonment zone laid before the officials of

DITCHING AN OPEN STREAM IN THE CITY OF LITTLE ROCK FOR THE CONTROL OF MOSQUITO BREEDING

For many years people living along this stream have suffered from malaria. Preventing the mosquitoes from breeding here destroys the carriers of the disease and thus safeguards the thousands of our young men who have come to train in Camp Pike. More than 80 miles of open ditch drains have been maintained in Little Rock during the past summer in such a way as to prevent mosquito breeding. This view shows a ditching gang at work clearing the small obstructions from the stream and trimming the rough banks so as to prevent eddies forming in which mosquito eggs may be deposited.

LETTING IN THE SUNSHINE BY CUTTING CAT-TAILS AND DRAINING SWAMPS:

In order to rid a community of the malaria scourge, it is necessary to do away with mosquitoes. This can best be done by destroying their breeding places. The picture shows the digging of a ditch in order to drain an area of stagnant water in which hundreds of thousands of mosquitoes were breeding in an extra cantonment area.

FISHING FOR MOSQUITO LARVÆ IN A CAT-TAIL SWAMP: EXTRA CANTONMENT ZONE, CAMP ZACHARY TAYLOR

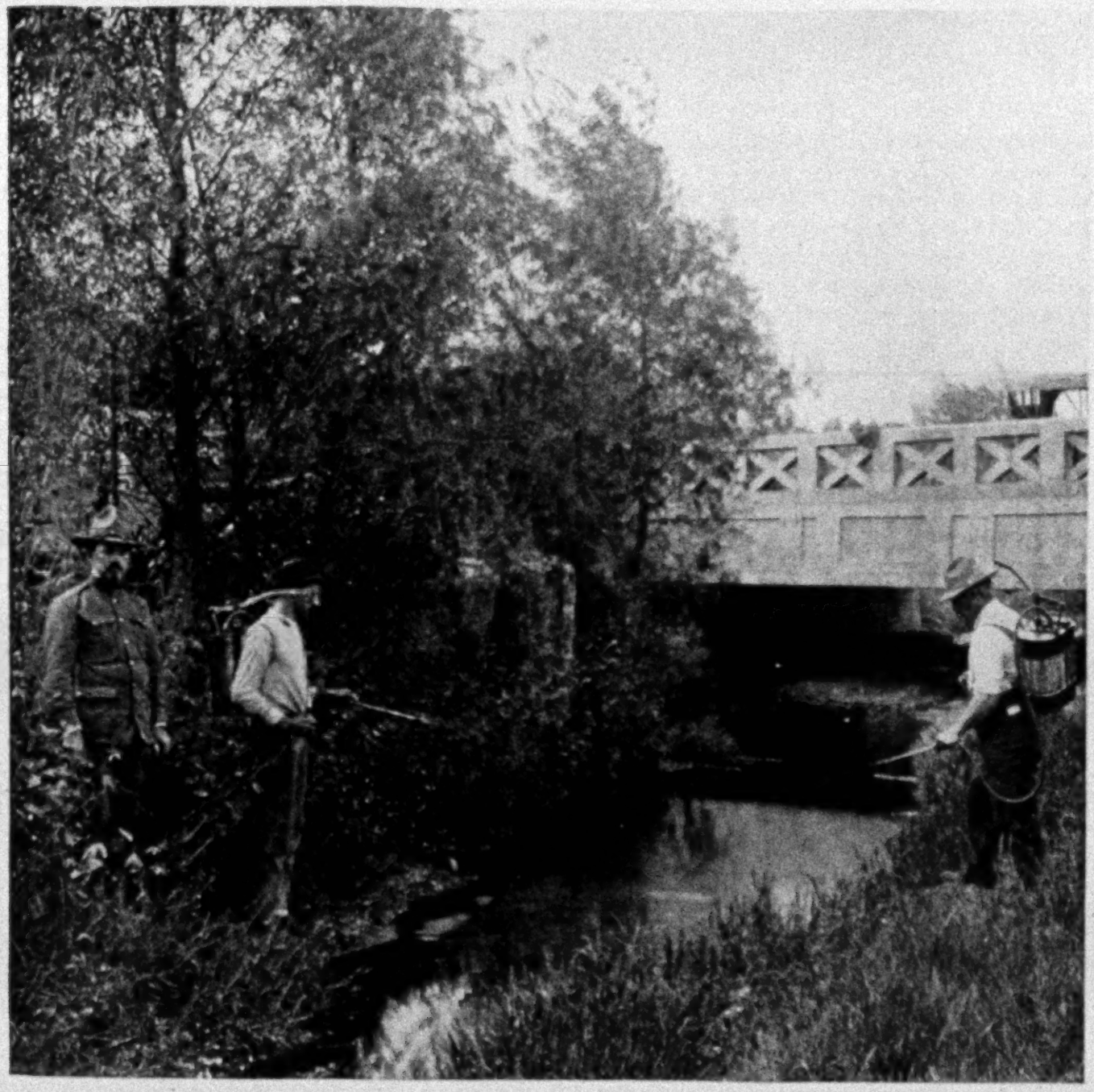
ON STREAMS WHERE THERE IS A PERMANENT FLOW OF WATER, DRIP-CANS ARE INSTALLED TO FURNISH A CONSTANT FILM OF OIL FOR SUCH STREAMS

The box lid, now turned down, is closed and locked after the can is filled with oil. The faucet on the drip-can is adjusted so that from twenty to thirty drops of oil per minute fall upon the water surface through a small opening in the bottom of the box. The padlocks on all drip-can boxes are opened with one master-key. The photograph was made on Swaggerty Creek, within the limits of the city of Little Rock.

the company the necessity for adequate toilet facilities. No action was taken. Again he brought the matter to their attention, this time in writing. Still there was no result. The case was taken into court, and the railway company fined $50 and directed to start work immediately. In reporting this incident to the Bureau, the officer in charge expressed his regret at being obliged to take this course of action, because, he said, "I had hoped to conduct this entire campaign without a single arrest."

Space does not afford to tell the story in its entirety—to describe the methods by which over 60,000 civilians in the extra-cantonment zones alone have been voluntarily vaccinated against typhoid fever since the 1st of July; of the way in which the medical inspection of schools has been instituted at various points; of the methods pursued in securing the active coöperation of recalcitrant councilmen in the passage of milk ordinances which had hitherto been opposed by reason of financial interests in the dairies.

Whole rural communities in which a few months ago not a single family was supplied with sanitary outhouses, now dispose of their excreta in concrete



VIEW SHOWING OILING OPERATIONS FOR THE CONTROL OF MOSQUITO BREEDING

Such pools as cannot be drained are sprayed with a mixture of one-half kerosene and one-half crude petroleum once each week. For this work knapsack hand sprayers are used, which enable the oilers to throw a stream of oil a distance of 20 to 30 feet.

vaults, and parenthetically it may be remarked that the cost of construction of these vaults has been reduced from over $50 to an average cost of $12.07, including labor and material (see page 270).

WATCHING FOR SPUTUM-BORNE DISEASES

The work, of course, is being continued. In fact, it may be said to be just beginning. Of necessity all the year round there must be a fight against the excreta-borne diseases. From the 15th of February to the 15th of September there must be a ceaseless war upon the mosquito. From the 15th of September to the 15th of April, the time in which people are herded most closely together, every known measure must be taken to control the acute sputum-borne diseases.

By acute sputum-borne diseases is meant mumps, measles, whooping-cough, cerebro-spinal meningitis, and that horde of general infections embraced by the term "common colds." The great remedy which society possesses in the combat against these diseases is general education in personal hygiene, so that infected individuals will take due precaution to prevent the transference of their disease-bearing sputum to others.

Of course, everything which is being done in this campaign helps to control tuberculosis, and it may be predicted that one of the by-products of the war will

be a decrease in the great white plague. When all is said and done, the cure and prevention of this disease lies in the full dinner-pail and all that goes with it, and coincident with the rise in wages and the increase in employment there will be an increase in food, and an improvement in housing, clothing, and all of the other things which tend to counteract the miseries of human life.

The energetic campaign which is being waged in cooperation with the strictly military authorities against those insidious social diseases whose occurrence is such a threat against organized society and the successful conclusion of the war deserves a word.

COMBATING INSIDIOUS SOCIAL DISEASES

Suffice it to say, that through the administration of the vice law by the War Department and the frank education of the general public by the Public Health Service, much is being accomplished. This problem is being handled solely on the basis of the prevention of the spread of communicable disease.

When it is realized that the diseases comprising this group are largely spread by chronic carriers, and that contact, either direct or remote, is the method by which this spread occurs, it is realized that there need be no more hesitancy in frankly combating them than obtains in the case of the other diseases which are spread by contact; for example, smallpox, which, terrible as it is, does not even remotely approach the disastrous effects which the social evil works on the present generation as well as those yet unborn. Dispensaries are being established for the cure of civilians who have these diseases and are therefore potential distributors of them.

Healthful recreations are being provided by the War Department to counteract the allurements of vice. The general public in the extra-cantonment zones is being organized in an attempt to control the spread of these entirely preventable diseases. Some of this work is being done entirely by the War Department; some entirely by the Public Health Service, and all of it is being done in complete and close cooperation between the two departments. That there is great need for this work there can be no doubt; that it will do great good is equally true.

BETTER NATIONAL HEALTH A BY-PRODUCT OF THE WAR

One thing is certain, the work which is now going on is building permanently for a better public health. It is laying the foundations for an improvement in community conditions which we have every reason to believe will gradually spread throughout the United States. In each of the places in which the Public Health Service is now conducting its operations a strong and enduring health machine is being built up. Just as soon as the local community will take this over, it will be transferred. The model morbidity registration areas will, it is hoped, gradually expand peripherally, until by the meeting of their borders they will coalesce and we will have in America a system for the collection of disease data, the like of which the world has never seen.

This campaign means much more than the present protection of the public health. It is a gigantic demonstration of what can be accomplished in the prevention of disease. Just as the work which was done in the control of malaria at Panama set a standard for all the world, so the present operations will lead to sanitary campaigns in zones which at present are only rather remotely concerned with the war movement.

In the areas in which the government is now conducting this wholesale onslaught on communicable disease there will be a lowering in the sickness rate, a decrease in the number of deaths, an improvement in the efficiency of the whole community, with a consequent added prosperity. Results such as these can be obtained at any place in the world in which the people and their health guardians are willing to work actively and intelligently.

One thing this war has taught us: men are not so cheap as we once thought them. Human life and human efficiency are the two most precious things on earth. If out of this awful labor of war a strong public health sentiment for the entire nation can be born, then will our sacrifices not have been in vain.

PRACTICAL PATRIOTISM

MEMBERS of the National Geographic Society will be highly gratified to learn of the many important ways in which their organization has been able to coöperate with the national government in this critical hour of our country's history.

When the draft law was passed, a tremendous burden was thrown upon the offices of the Provost Marshal General in the mailing of special instructions to thousands of officers throughout the country, where 10,000,000 men were to register. In this emergency the services of all the graphotype machines used in making stenciled addresses for the GEOGRAPHIC were offered. The offer was accepted at once, and the entire force of young men employed in the addressing department volunteered to work day and night in making the thousands of stencils which the government required, and the work was thus completed in record time and without expense to the War Department.

Several hundred young ladies of the staff have made innumerable sweaters, neckpieces, and socks for our sailors and soldiers, and bandages, towels, sheets, etc., for the Red Cross, and have, furthermore, equipped themselves for emergency by taking special courses in first-aid nursing.

The entire staff of the Society's offices was placed at the disposal of the Secretary of the Treasury during the First Liberty Loan campaign, in order that each of its 610,000 members might receive by mail the government's appeal, to which there was a phenomenal response.

AIDING THE RED CROSS

On the day the announcement was made of the campaign to raise one hundred million dollars for the American Red Cross, the Director and Editor of the Society took from the presses the forms for the issue of the NATIONAL GEOGRAPHIC MAGAZINE, then ready, and remade the issue completely, in order that the Society's members might be told of the imperative needs of the Red Cross, of that which must be achieved during the coming months, and of the funds required to prepare for such a tremendous task. This movement was given splendid impetus by printing in the Society's magazine, while the $100,000,000 campaign for funds was at its height, special articles and addresses by Henry P. Davison, Chairman of the War Council of the Red Cross; Ian Malcolm, member of the British Red Cross, and of the House of Commons; John H. Gade, of the American Commission for Relief in Belgium; Herbert C. Hoover, the Food Administrator, and former head of Belgian Relief Work; Frederick Walcott, of the Food Administration; Newton D. Baker, Secretary of War; General John J. Pershing, commanding the American expeditionary forces in France; former President William Howard Taft, and Eliot Wadsworth, Executive Secretary of the American Red Cross, and others.

In the same issue of the Magazine full-page advertisements were published gratis for the American Red Cross fund, for the Y. M. C. A. War Fund, and for the First Liberty Loan.

THE PATRIOTIC FLAG SERIES

One of the most important contributions to be made by the Society to the cause of America at War will be the publication of a special "Flags of the World" number, containing the most expensive series of four-color plates ever printed by any publication in the history of the magazine industry. It will be a popular digest of patriotism as exemplified in the national emblems, past and present, of our own and of all other countries, each subject absolutely accurate as to design and color, a total of more than one thousand color illustrations, besides numerous pages in black and white. The standards, pennants, and insignia have been assembled by the foremost flag expert of the American Government, and probably the foremost authority on national ensigns in the world. The descriptive and historical text accompanying the flags will represent six months' of exhaustive research by the magazine staff. The color work alone in this issue will cost $60,000, and the number will be the world's most thorough and authentic text-book on the flags of seven centuries.

THE NATIONAL GEOGRAPHIC WARD

An activity of the Society which is appealing with special force to its patriotic membership is the announcement of the plan to establish in the American Ambulance Hospital at Neuilly, France, a special *National Geographic Society Ward*, consisting of twenty beds. This American hospital is housed in a splendid four-story building surrounding a beautiful court. It is now accommodating 1,500 patients daily in its main building and its auxiliary institutions.

This hospital was established by American subscriptions, and the Geographic's ward will be a notable addition to this magnificent humanitarian institution for the relief and care of young Americans who will bear the brunt of battle against the Huns. In inviting contributions to this fund from its members the Society gives assurance that there will be no overhead expense in the handling of the contributions, but that every dollar subscribed will be devoted to equipment and maintenance of the ward.

THE LIBERTY LOANS

In the campaign for the Second Liberty Loan of $3,000,000,000, just launched, the Society was one of the first organizations to proffer, without cost, the pages of its magazine, the GEOGRAPHIC, to the government—an offer which was accepted, as upon the occasion of the successful flotation of the First Liberty Loan of $2,000,000,000.

The National Geographic Society has subscribed from its reserve funds $100,000 to the Liberty Loans.

In the great work of bringing home to the people of America the imperative need for the conservation of the nation's food resources, no agency has been more whole-hearted or more effective than our Society, whose more than 600,000 members have been and are being kept in closest touch with the National Administration in its great educational campaign. Through the pages of the GEOGRAPHIC the Food Administrator has been given the opportunity to speak directly to those gathered at the firesides of more than half a million of the most representative and influential American homes.

In a similar manner, guardians of the nation's health, and especially of the health of the national army now assembled for training in the cantonments scattered throughout the land, are speaking through the pages of the GEOGRAPHIC to the great civilian population in the vicinity of these cantonments, explaining how the health of the new army can be safeguarded by civilian coöperation.

And, as the needs of the nation grow greater in these stressful days, the administrative headquarters of the Society in Washington is daily finding new avenues of activity and usefulness.

CONTRIBUTING SUBSCRIPTIONS TO OUR ARMY AND NAVY

The GEOGRAPHIC is now being sent gratis to the reading-rooms, libraries, the Y. M. C. A. and Knights of Columbus buildings in every aviation camp, army and navy camp, cantonment, and officers' training camp in the United States, while the boys in khaki "Over There" are likewise receiving OUR magazine regularly, their spirits heartened by the illuminating illustrations and comprehensive articles telling of what is being done on this side of the Atlantic to help them in their great undertaking to make the world safe for democracy.

When the "Flags of the World" issue of the GEOGRAPHIC comes from the press (the next number), ten thousand copies will be donated by the Society to the two arms of the service—5,000 copies going to the navy and 5,000 to the army. The heads of both branches of the service have already expressed their sincere appreciation of the valuable and useful gift of the most complete and authoritative work on flags and insignia ever compiled in any country—a work which will stir the patriotic pride of every American, whether in civil or military life.

Thus is its power for practical patriotism being exercised by the National Geographic Society, the largest scientific organization in the world—an organization established not for profit, but for the diffusion of geographic knowledge and for the furtherance of the enlightenment, entertainment, and happiness of the citizens of the United States of America. These ends can only be achieved in an atmosphere of security, freedom, and peace, and to aid in guaranteeing these requisites of human happiness the GEOGRAPHIC is enlisted with all its resources and the combined patriotic fervor of its whole membership.

Victrola XVII, $250
Victrola XVII, electric, $300
Mahogany or oak

Victrola-the highest attainment in the arts of sound

The mission of the Victrola is purely one of transmission. The recorder and reproducer should tell the simple truth, no more, no less.

The Victrola is not an instrument in which the interpretation and expression depend on the player like the organ, piano, etc. No instrument can be made to *improve* on Melba, Caruso and the other great artists. The true function of the Victrola is to reproduce faithfully the work of these artists.

The only modifications permissible are those obtained by *changing the needles* from *loud tone* to *soft tone* and by adjusting the *sound doors* to suit the size of the room or the mood of the listener.

There are Victor dealers everywhere, and they will gladly play your favorite music for you and demonstrate the various styles of the Victor and Victrola—$10 to $400.

Victor Talking Machine Co., Camden, N. J., U. S. A.

Berliner Gramophone Co., Montreal, Canadian Distributors

Victor Supremacy

"Victrola" is the Registered Trade-mark of the Victor Talking Machine Company designating the products of this Company only. **Warning:** The use of the word **Victrola** upon or in the promotion or sale of any other Talking Machine or Phonograph products is misleading and illegal.

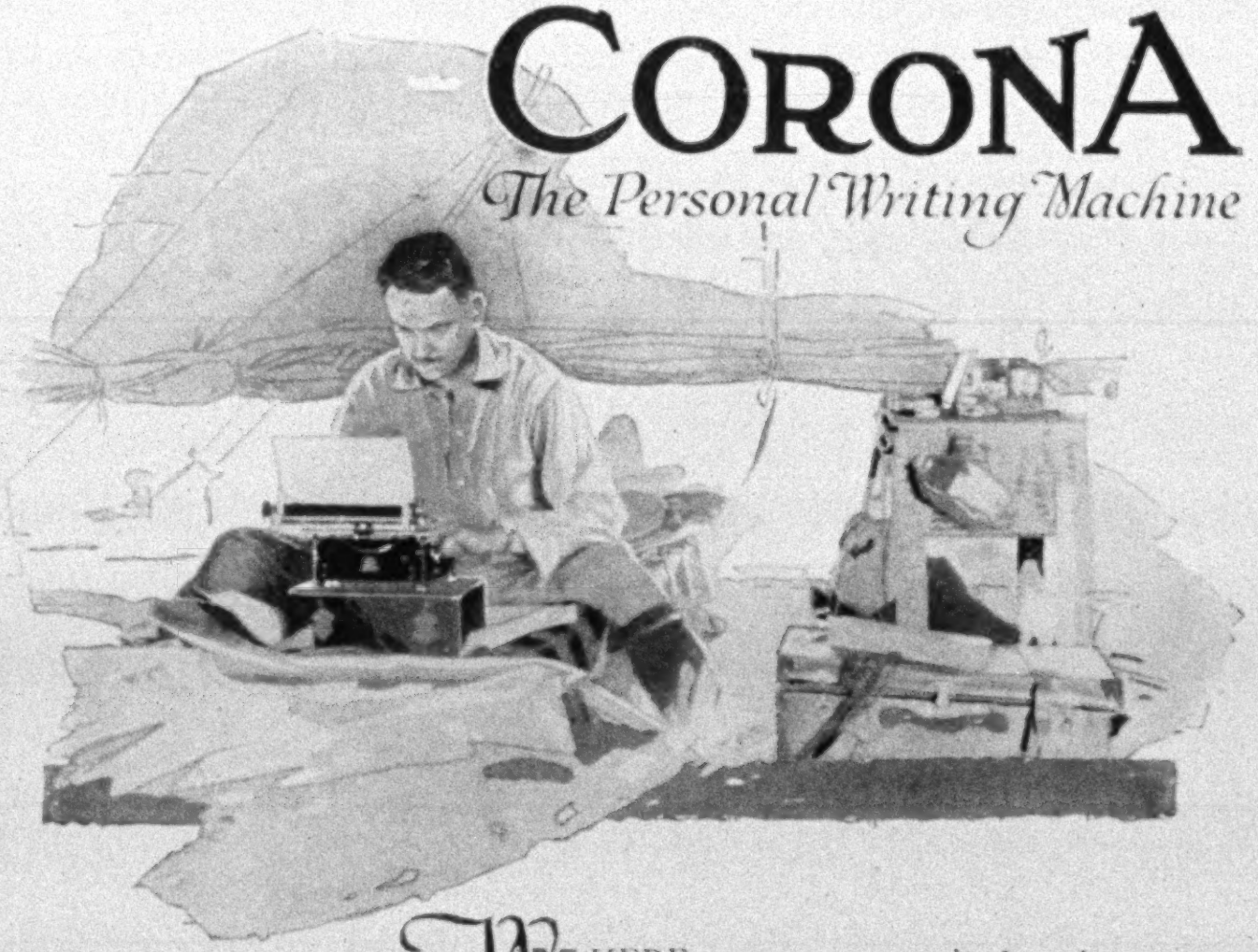
To insure Victor quality, always look for the famous trademark, "His Master's Voice." It is on all genuine products of the Victor Talking Machine Company.

New Victor Records demonstrated at all dealers on the 1st of each month

Important Notice. Victor Records and Victor Machines are scientifically coordinated and synchronized by our special processes of manufacture, and their use, one with the other, is absolutely essential to a perfect Victor reproduction.

CORONA

The Personal Writing Machine



Wallace Smith, of the Chicago "American," with Pershing's column in Mexico.

WHERE every extra pound of equipment is a handicap, and where convenience, adaptability, and rugged strength are all essential, there you will find Corona.

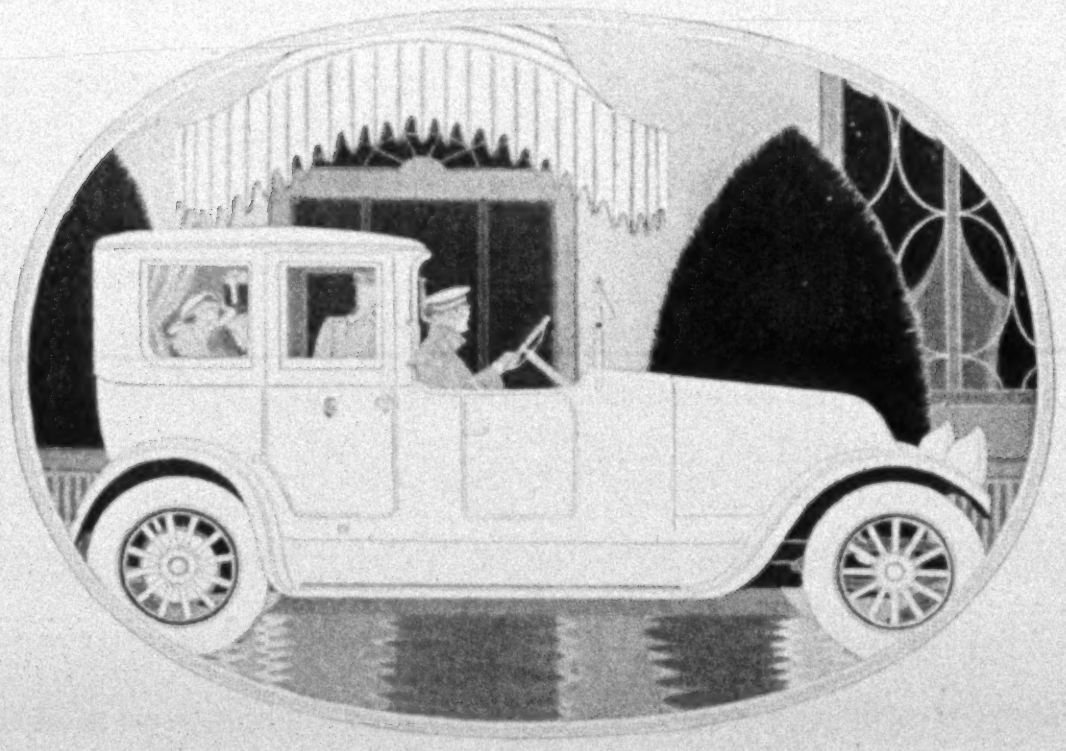
Not only have war correspondents, army officers and adventurous travelers learned to appreciate Corona, but a hundred thousand men and women in every walk of life have made it their *personal writing machine.*

With Corona you can handle the intimate details of your work privately and put all your personal correspondence or reports into neat, legible, business-like form, with carbon copies for future reference.

Corona weighs but 6 pounds, and *folds* for travel so compactly that you can take it anywhere. Cost, complete with case, $50. Write for booklet No. 27 and learn the details of this unique and helpful little machine.

CORONA TYPEWRITER CO., GROTON, N. Y.
NEW YORK : : CHICAGO : : SAN FRANCISCO
AGENCIES IN ALL PRINCIPAL CITIES

-fold it up-take it with you-typewrite anywhere



Three Times As Many People Are Now Buying Franklin Enclosed Cars

"Americans," said a foreign critic, "know the *price* of everything and the *value* of nothing."

That was before we entered the War. Today it is a different story.

Only a short time ago an Enclosed Car had to be *everything but practical* to attract the average car buyer.

But today economy is being forced daily on the attention of the motorist. Now he is looking for a way *to cut his gasoline cost and tire cost in half* and maintain his mileage.

An unfailing gauge of the worth of any fine car today is the way it is selling *today*. The *sale facts* about the Franklin are interesting.

Franklin Cars are being built at a rate of *three times as many as a year ago* and the demand continues to *exceed production*.

Franklin Enclosed Cars were bound to become more popular each year, even in normal times. The War, forcing *utility* and *economy* before everything else, quickened this movement.

Consider the gasoline mileage of 179 Franklin Open Cars on July 13th, 1917, under standard efficiency test rules—average, 40.3 miles to the single gallon of gasoline. Consider the owners' tire reports, *over a five-year period*—average, 10,203 miles.

And the *same* economies of the Franklin Open Models apply, within a few per cent, to the Franklin Enclosed Cars.

There is something here for every car owner to think about—and these are days when a car owner *has* to think if he wants to *ride*.

Sedan	2610 lbs.	$2950.00	Cabriolet	2485 lbs.	$2850.00	Brougham	2575 lbs. $2900.00
Town Car	2610 lbs.	3200.00	Limousine	2620 lbs.	3200.00	*All Prices F. O. B. Syracuse*	

FRANKLIN AUTOMOBILE COMPANY

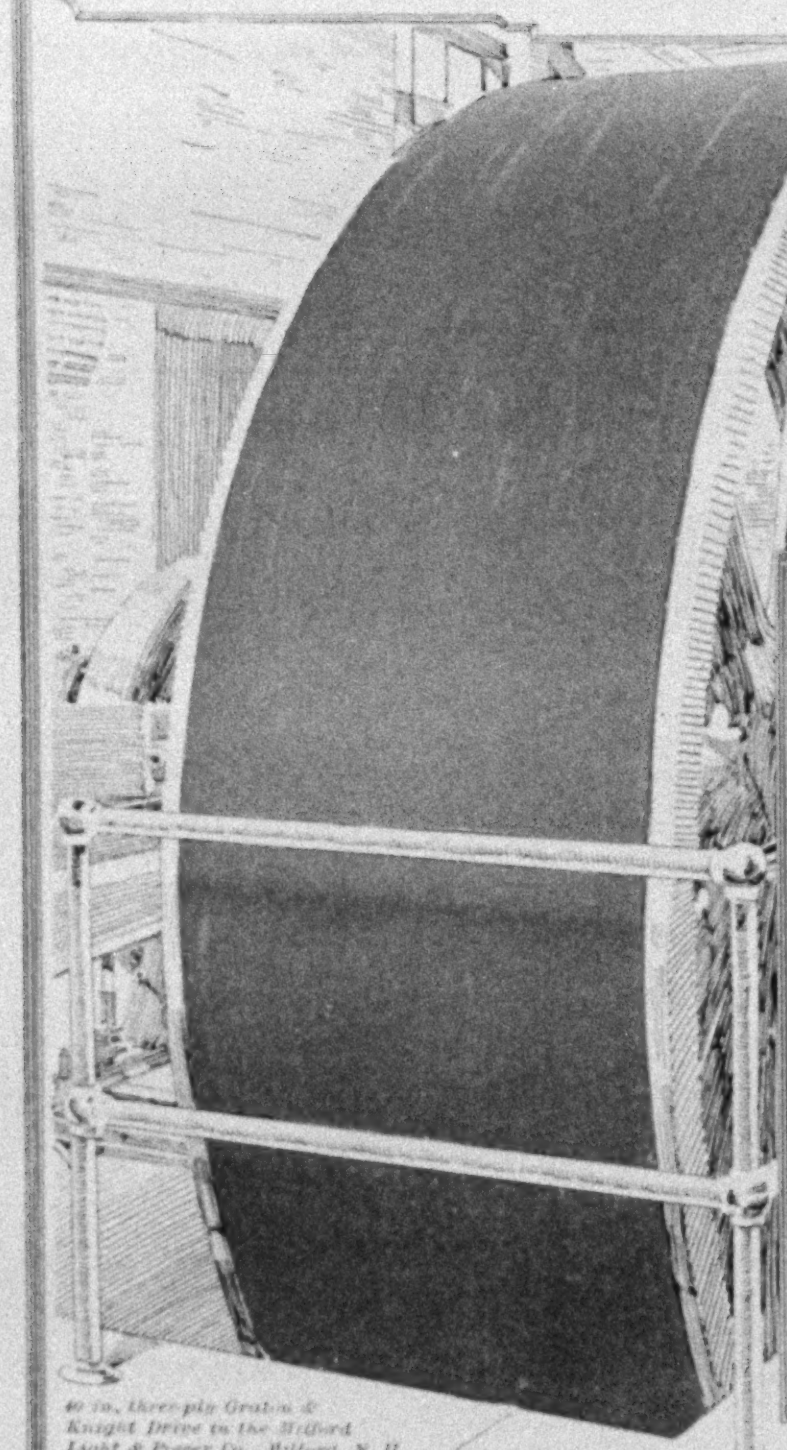
SYRACUSE, N. Y., U. S. A.

GRATON & KNIGHT

Standardized Series

LEATHER BELTING

Tanned by us for belting use



40 in., three-ply Graton & Knight Drive in the Milford Light & Power Co., Milford, N. H.

What Is Standardized Belting?

Standardization of Graton & Knight Belts is not new. They have been standardized for many years.

They have been standardized on the basis of the work to be done—not made to meet theoretical specifications laid out on paper for belt-makers to follow blindly.

During 66 years of actual usage, these belts have survived and evolved into recognized, practical standards.

And because they have evolved on the job, they have gradually become fitted to each kind of belting job. There is a brand for every need—a complete and adequate Series of Standardized Belts.

Standardize the buying of your belting—and learn why it is so simple, so practical, so safe to specify simply "Graton & Knight—or equal."

The Graton & Knight Mfg. Company

Oak Leather Tanners, Makers of Leather Belting, Lace Leather Packings and Specialties

Worcester, Mass., U. S. A.

Distributing Warehouses and Representatives in Principal Cities

GRATON & KNIGHT

Answering the Nation's Call

IN this "supreme test" of the nation, private interests must be subordinated to the Government's need. This is as true of the telephone as of all other instrumentalities of service.

The draft for war service which has been made upon the Bell System is summarized in a recent Government report.

Government messages are given precedence over commercial messages by means of 12,000 specially drilled long distance operators all over the country.

The long distance telephone facilities out of Washington have been more than doubled.

Special connections have been established between all military headquarters, army posts, naval stations and mobilization camps throughout the United States.

More than 10,000 miles of special systems of communication have been installed for the exclusive use of Government departments.

Active assistance has been given the Government by the Bell System in providing telephone communications at approximately one hundred lighthouses and two hundred coast guard stations.

Communication has been provided for the National Guard at railroad points, bridges and water supply systems.

A comprehensive system of war communication will be ready at the call of the Chief Signal Officer, and extensive plans for co-operation with the Navy have been put into effect with brilliant success.

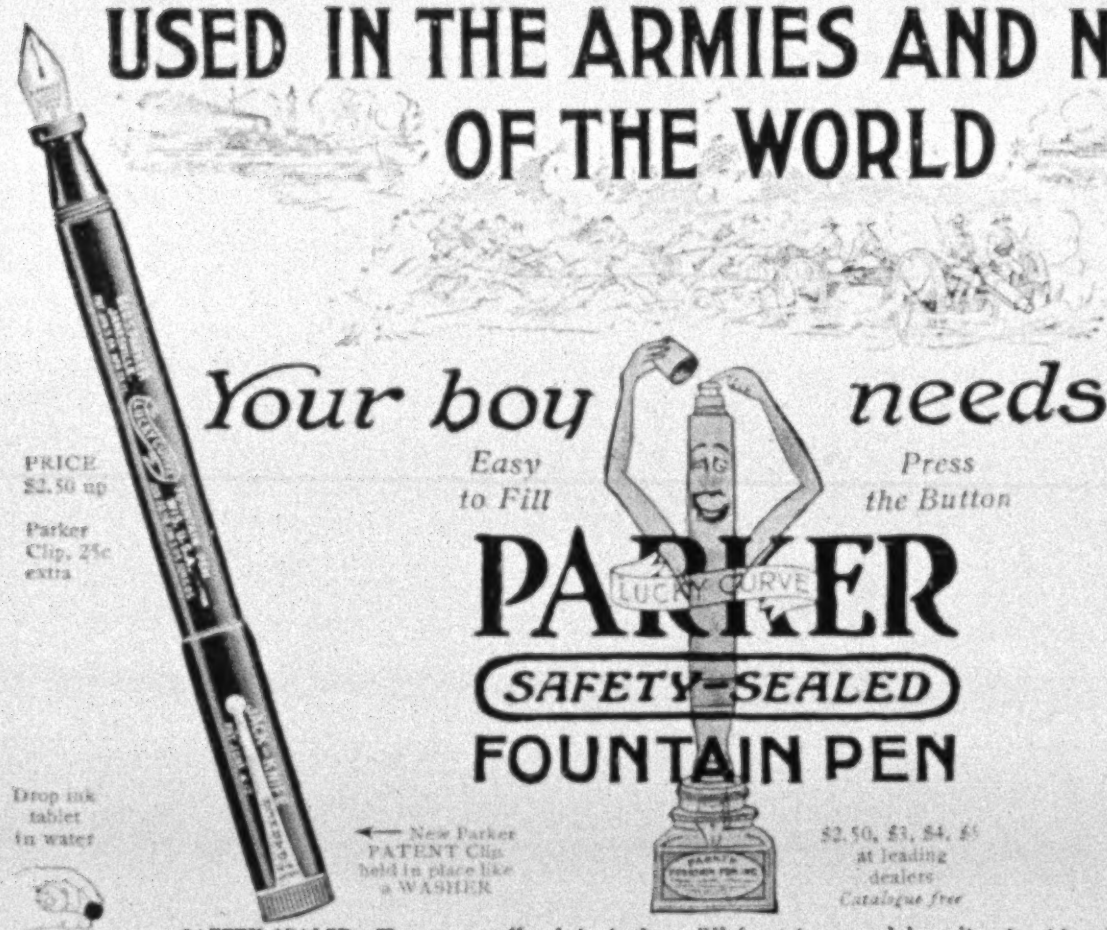
As the war continues, the demands of the Government will increase. And the public can help us to meet the extraordinary conditions by putting restraint on all unnecessary and extravagant use of the telephone.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

One Policy *One System* *Universal Service*

"Mention the Geographic—It identifies you."

USED IN THE ARMIES AND NAVIES OF THE WORLD



Your boy needs a

Easy to Fill — *Press the Button*

PARKER
SAFETY-SEALED
FOUNTAIN PEN

PRICE $2.50 up

Parker Clip, 25c extra

PRICE Sterling Silver, $5

18-K. Gold Plate, $6

Drop ink tablet in water

← New Parker PATENT Clip held in place like a WASHER

$2.50, $3, $4, $5 at leading dealers *Catalogue free*

Dissolves immediately into fluid ink

SAFETY-SEALED—The new type "no holes in the wall" fountain pen. Ink can't get out to soil clothes or person

In event of accident to interior mechanism, pen automatically changes from Self-Filler to non-Self-Filler, no interruption in service.

← PARKER INK TABLETS → For a soldier's "kit" in place of fluid ink

10c. per box of 36 tablets

PARKER PEN COMPANY, 18 Mill Street, Janesville, Wisconsin; New York Retail Store, Woolworth Building

---

RECOMMENDATION FOR MEMBERSHIP

in the

National Geographic Society

The Membership Fee Includes Subscription to the National Geographic Magazine

DUES: Annual membership in U. S., $2.00; annual membership abroad, $3.00; Canada, $2.50; life membership, $50. Please make remittances payable to National Geographic Society, and if at a distance remit by N. Y. draft, postal or express order.

Please detach and fill in blank below and send to the Secretary

.....

.....191

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest,
Washington, D. C.:

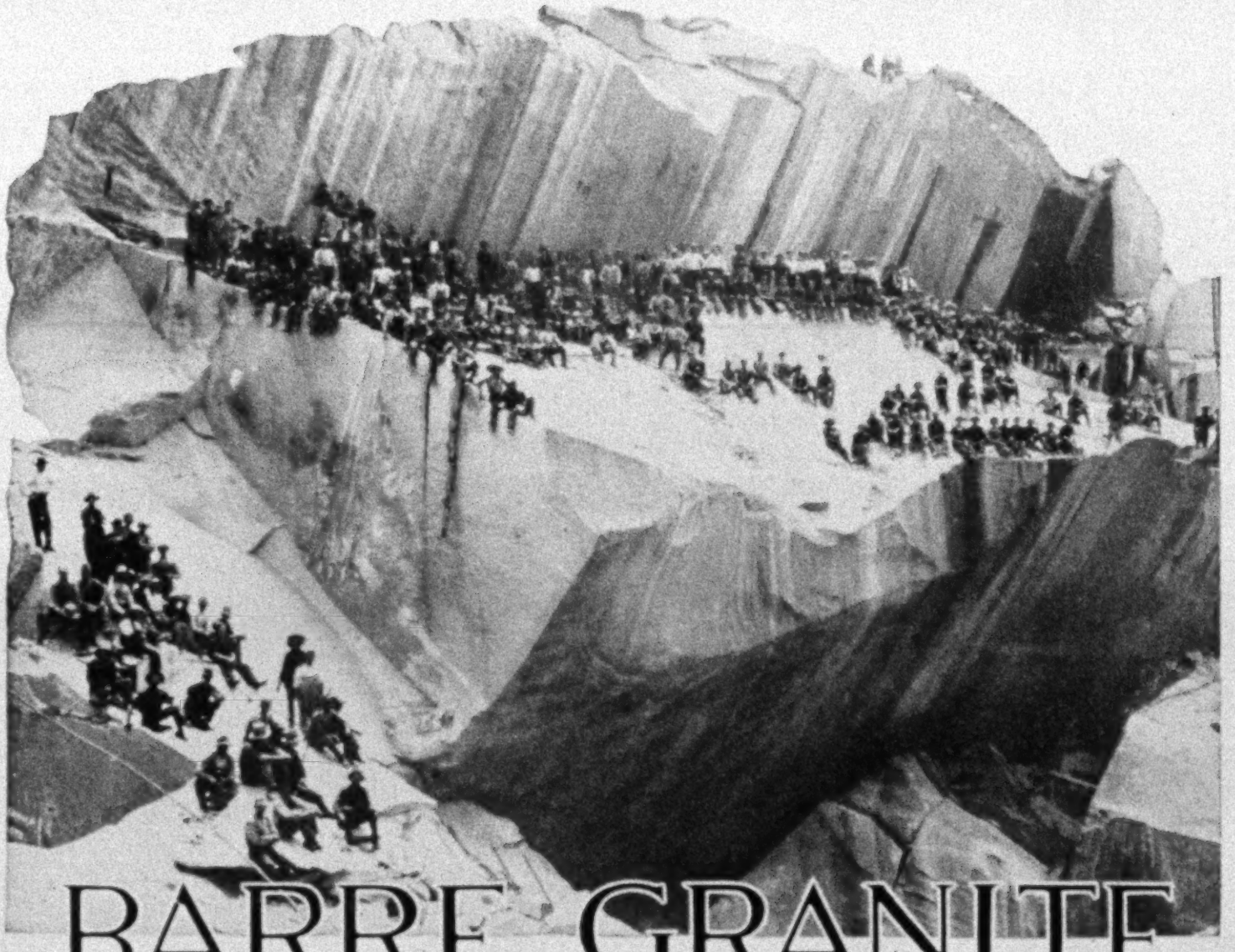
I nominate .....

Address .....

.....

for membership in the Society.

9-17 (Write your address.)



BARRE GRANITE

is here shown in its native majesty. In the Green Mountains of Vermont are those matchless hills of perfect granite, and in the heart of the district is Barre.

This scene represents but one section of one of the dozen or more productive quarries in the Barre district, yet it shows the splendid proportions of the industry.

Thousands of men quarry the product — other thousands take it as it comes from the hills and shape it into Mausoleums, Monuments and Memorials of all kinds, into fine carvings, etc.

For Memorials, large or small, expensive or inexpensive, Barre Granite is ideal. It is perfect in texture and beauty, is hard and dense, is adaptable to any treatment, and its low absorptive power prevents discolorations. When covered with dust and dirt it is easily cleaned with washing powder and water.

Specify genuine Barre for every part of your Memorial—and make this a present-day duty instead of leaving it to others. Talk to your dealer about Barre Granite. See it in local cemeteries.

The free book—"Memorial Masterpieces"—shows many fine examples of Barre Granite treatment. Write for it.

Barre Quarriers and Manufacturers Ass'n
Dept. B, Barre, Vermont

The Granite Center of the World

"Mention the Geographic—It identifies you."

Economy + Style

Shelltex
TRADE MARK
Shur-on
EYEGLASSES & SPECTACLES

Economical, besides being comfortable and stylish, for they protect the glasses from breakage and save extra lenses.

Like all Shur-ons—Quality Guaranteed. At most high-grade optometrists, opticians and oculists, or write us. Look for the name Shur-on or Shelltex in the bridge.

E. KIRSTEIN SONS CO., 249 Andrew Street
←Trademark Est. 1864 Rochester, N. Y.

Salt Mackerel

CODFISH, FRESH LOBSTER

FOR THE CONSUMER NOT THE DEALER

FOR YOUR OWN TABLE

FAMILIES who are fond of FISH ought to get them DIRECT from GLOUCESTER, as no inland dealer anywhere else can possibly be in a position to offer you goods as perfect and wholesome as we can.

We sell ONLY to the CONSUMER DIRECT, not through grocers or markets. We want to supply YOU, no matter how small your requirements.

We have done a mail-order fish business for thirty years, sending the goods RIGHT TO OUR CUSTOMERS' HOMES, EXPRESS PREPAID EAST OF KANSAS, and guaranteeing complete satisfaction or money refunded.

If you are interested in good fish, won't you drop us a postal that we may send you further information?

Our SALT MACKEREL are tender, juicy fellows—broiled for breakfast they are delicious. SALT CODFISH selected and prepared by our method is unexcelled.

Much of the fresh fish you buy in the market is at least several days old. OUR CANNED FISH, being STEAM STERILIZED, is ABSOLUTELY FRESH.

Our FRESH LOBSTERS, in parchment-lined cans, go through no process except boiling (no preparation of any kind being used). Opened and packed solid in whole pieces as soon as taken from the water, they retain their crispness and natural flavor. CRABMEAT, SHRIMP and CLAMS have likewise a perfectly natural appearance and taste.

Our SALMON, TUNNY and IMPORTED FISH DELICACIES are always the best produced.

A selection of our FISH PRODUCTS should always be in your STORE-ROOM for daily use and for the preparation at a moment's notice of dozens of dainty or substantial dishes.

Send for Descriptive Price List

Frank E. Davis Co., 250 Central Wharf, Gloucester, Mass.

This is

John Philip SOUSA

March King and President of The American Trap Shooters' Association, with an

ITHACA GUN

Mr. Sousa knows the lightning lock of an Ithaca improves his shooting; it will improve yours.

Catalogue FREE—double guns $24.00 up; single trap guns, $85.00 up.

Address, Box 15

ITHACA GUN CO.

ITHACA, N. Y.

DEAF?

Make This Test In Your Own Home

The Acousticon will surely make you hear because it has succeeded with over 300,000 delighted patrons of ours who were so troubled.

You do not know this, however, and we are confident enough to want everyone to *know* before he spends a cent.

Everyone knows that deafness is progressive—and unless the ears are stirred to activity they grow steadily worse; thousands write us the Acousticon enables them to hear perfectly and has permanently improved their hearing.

Therefore we ask that you write us, saying: "I am hard of hearing and will try the Acousticon"—That's all. We will send you, delivery charges paid, the

Acousticon For Ten Days' FREE TRIAL

No Deposit—No Expense

All we ask is that you give it a fair trial in your own home and among familiar surroundings. Then there can be no doubt of whether it improves your hearing.

If it does not do so, we want it back without a cent of expense to you for the trial, because we know it is good business policy to have none but satisfied and enthusiastic customers—That's the only kind we now have. Write for your FREE TRIAL today.

GENERAL ACOUSTIC CO., 1311 Candler Bldg., N. Y.
Canadian Address, 621 New Birks Bldg., Montreal

ONE CAN LIVE WITHOUT ART
—BUT NOT SO WELL

The·Medici·Prints

The Old Masters in Color

The·Copley·Prints

Masterpieces of American Art

THE MUSIC LESSON.—Lancret. Medici Print

For GIFTS and for YOUR HOME

UNSURPASSED for weddings, Christmas, birthdays. Also for adornment of our homes, schools, clubs; for elevation of taste in our children; for our own daily enjoyment: "*One can live without art—but not so well.*"

LARGE GALLERY OF SUBJECTS: We can show here but one of the 500 illustrated in our catalogues (see below). You will find in them an absorbing choice of subjects, from the great works of the Old Masters to the paintings of our own day—Corot and Inness landscapes; Abbey's *Holy Grail*; new mural decorations by Sargent and by Violet Oakley; inspiring patriotic subjects; Pictures appropriate for every occasion and for every room in the house, including many for your children.

AS TO QUALITY, THE COPLEY PRINTS received highest award gold medal from the French Government. "Excellent," says John S. Sargent. "I could not wish better."—Edwin A. Abbey. "So fine in quality."—Augustus Saint-Gaudens.

OF THE MEDICI PRINTS the London Times says: "Their perfection is little short of amazing." Mr. Holmes, Director of the National Gallery, London, says: "In truth of color, and detail they are, for most practical purposes, replicas of the original paintings."

YOUR OLD FAMILY PORTRAITS, reproduced privately in the COPLEY PRINTS—from old daguerreotypes, faded photographs, tintypes, kodaks, etc.—make unique gifts to your relatives. Particulars in Copley Catalogue (see below).

HOW OBTAINED: Through art stores or direct from us. We send on approval prepaid and with no obligation of purchase.

PRICES. From only a few dollars (down to 25 cents for Medici Miniatures) up to $25.00 for large sizes. Special attention to appropriate framing, at reasonable prices.

ILLUSTRATED CATALOGUES: Send 25 cents (stamps accepted) **for each Catalogue—50 cents for both.** These are not ordinary catalogues, remember; they are practically **Illustrated Hand-Books of Art.** Remember, too, the cost is deducted from a $2.50 purchase of the Prints. The Copley Catalogue is of American art (in rich sepia tone, some in color). The Medici Catalogue is of the Old Masters (all in color).

SEND NOW—to give you the more time for careful Christmas selections. *Address either*

CURTIS & CAMERON

or the new American Branch of

THE MEDICI SOCIETY

Offices:—243 Harcourt Street, BOSTON

Salesroom: Pierce Bldg., opp. Public Library

Vantine's

The Oriental Store.

New Catalog Is Ready!

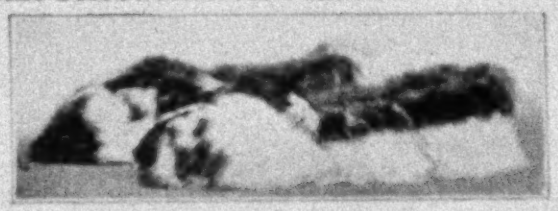
Write for Your Free Copy Now

SIMPLY forward your name and address, and by return mail we shall send post-paid this beautiful book of the Orient. Illustrates—many in actual colors—and describes thousands of distinctive and individual Oriental objects for the home, for personal use, and for presentation purposes.

Vantine's, the most interesting store in the world, is a wondrous, ever-changing exposition of unique and modern works of art and utility, from each nook and corner of Japan, China, Turkey, Persia, and India.

The Vantine Catalog brings this wonderful institution to your home and explains how you may shop with us by mail, no matter how far from New York you reside. Write now, as the edition is limited. Address Dept. 100.

Some Selections from Vantine's New Catalog



No. N8195. Japanese Spotted Rabbit fur slippers for men and women, fur lined. For indoor wear or (when ordered in overshoe sizes) to keep the feet warm when motoring, etc. In ordering, state size of shoe or overshoe worn. **Price, prepaid, $4.75.**

No. N15248. Cabinet of genuine Japanese lacquer, lined with velvet; contains two bottles of our most popular Oriental perfumes—each odor different. When emptied may be used as an ink well, or by simply removing the bottles you may have a jewel case.
Price prepaid, $1.00

No. N12316. Japanese hand-carved Wood Nut Set, consisting of a bowl and mallet with removable anvil in center of bowl, finished in a pretty shade of dark brown.
Price per set, prepaid, $1.00.

No. N12474. Natural Root Wood Card, Cake or Fruit Tray, made from an individual natural root, well polished and shows pretty grains and knobs.
Price prepaid, $1.75.

No. N1960. Curious Bankoware Teapot, representing the "God of Plenty," prettily finished with yellow cap, blue gown and vivid red carp. Has wistaria handle and strainer in spout.
Price prepaid, $1.25.

·A·A·VANTINE·&·CO·Inc·

Fifth Avenue and 39th Street, New York

Flowers Delivered Everywhere

There are many occasions and sudden happenings that make the telegraphing of flowers to distant points a service which exactly fits the moment. At such times the

United States Florists' Guarantee

assures you of the height of quality, care in packing, and timely delivery in any city within a few hours after receipt of your order.

Call on or phone any of our members given below. If you are at points remote from cities named, money can be telegraphed with orders.

BOSTON, MASS.:
Penn, the Florist
124 Tremont Street

WASHINGTON, D. C.:
Gude Bros. Co.
1214 F Street N. W.

NEW YORK, N. Y.:
Max Schling
22 West 59th Street

CLEVELAND, OHIO:
J. M. Gasser Co.
1006 Euclid Avenue

CHICAGO, ILL.:
Bohannon Floral Co.
70 East Monroe Street

WHEELING, W. VA.:
Arthur Langhans
1217 Chapline Street

KANSAS CITY, MO.:
Samuel Murray
1017 Grand Avenue

DETROIT, MICH.:
John Breitmeyer's Sons
Gratiot Avenue and B'way

NORFOLK, VA.:
Grandy, the Florist
269 Granby Street

ST. LOUIS, MO.:
Grimm & Gorly
7th and Washington Aves.

SAN ANTONIO, TEXAS:
F. C. Suchy
819 Navarro Street

HOUSTON, TEXAS:
R. C. Kerr Floral Co.
1001 Main Street

NEW HAVEN, CONN.:
John N. Champion & Co.
1026 Chapel Street

The above leading growers and florists of this country endorse the greenhouses of—

LORD & BURNHAM COMPANY
Builders of Greenhouses and Conservatories
42d Street Building, New York City

A Garden Full of Darwin Tulips for $1.25

In anticipation of again placing before our customers a collection of Darwin Tulips we have had a sufficient quantity grown so that we can offer

75 Giant Darwin Tulip Bulbs, Finest Mixed, for $1.25

selected from fifteen named varieties.

Few spring flowering plants rival the Darwin Tulip for brilliance of bloom. With flowers as large as the Oriental Poppy, ranging in color from white through the lighter shades of pink to rich scarlet, from pale lavender to rich tones of violet, purple, and maroon, borne on strong stems often exceeding three feet, they are a wonderful addition to the Flower Garden.

Plant any time before the ground becomes frozen, and they will bloom from the middle of May to Decoration Day.

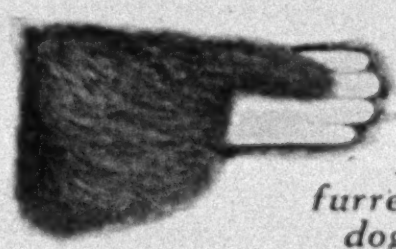
Cultural Directions in Every Box.

Mail this advertisement with check, money order, cash, or stamps, and secure this exceptional collection, sent prepaid to any point in the U. S. east of the Mississippi. For points west thereof and Canada, kindly include an additional 25c. to cover cost of delivery.

Copy of our 1917 Fall Bulb Catalogue sent on request.

Stumpp & Walter Co

30 and 32 Barclay Street New York



$5.00 by mail,

Made of thick furred glossy black dog skins

Above are lined with lamb skins. Price with mohair fleece linings, $4.50. Any buyer not entirely satisfied may return them before soiling and have his money. Our illustrated catalog gives measure directions and a whole lot of other information about custom tanning of hides and skins with hair or fur on; coat, robe, and rug making; taxidermy and head mounting; also prices of fur goods and big mounted game heads we sell.

THE CROSBY FRISIAN FUR COMPANY,
Rochester, N. Y.

Bronze Memorial Tablets

JNO. WILLIAMS, Inc.
(Established 1875)
STATUARY BRONZE FOUNDRY
Dept. T, 556 West 27th St.
New York City

Designs and Estimates furnished free.
Send for Illustrated Pamphlet on Bronze Tablets.
Lincoln Portrait in Cast Bronze, 5¼" in Diameter.
Price, $1.00, Postage Paid

KOREA Comes to WALTHAM for TIME

Awakening to the call of civilization, Korea declared:

"We will have the most accurate, the most reliable watch to keep time on our new railroads. We will send out men wise in these matters to find that watch for us."

And they came to Waltham.

What they found was superior to the offerings of England, Switzerland or France.

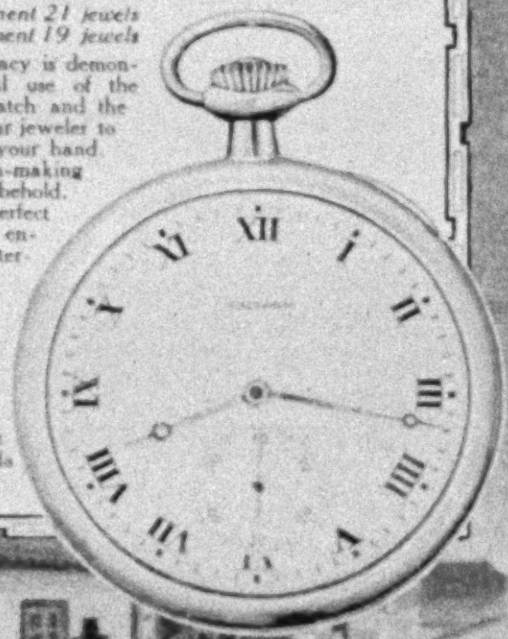
There are more Waltham watches in use on the world's railroads — including the United States and Canada — than all other makes combined.

The Colonial A

A dependable extra thin timepiece

Maximus movement 21 jewels
Riverside movement 19 jewels

Waltham watch supremacy is demonstrated by the universal use of the Vanguard Railroad Watch and the Colonial A. Allow your jeweler to place the Colonial A in your hand. Here is a work of watch-making art that is beautiful to behold. The refinement, the perfect size, the richness of the ensemble denote the masterpiece.



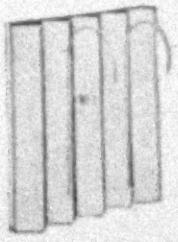
WALTHAM
WATCH CO.
Waltham, Mass.
189 St. James St
Montreal, Canada

There is Nothing in the World
So Watchful Over Time as the WALTHAM Watch

SAVO AIR MOISTENER

Fill with water, hang on back of any radiator out of sight

Converts dry indoor air into a moist, wholesome, healthful atmosphere.



IT WILL SAVE

Your Health.
Furniture from shrinking.
Piano from warping.
Paintings from cracking.
Wall Paper from peeling.
Book Bindings breaking.
House Plants from dying.
Whole family from colds.

Write For FREE Booklet.

SAVO Manufacturing Company

315 New York Life Building — Chicago, Illinois

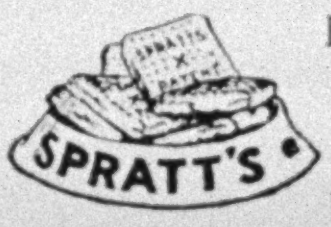
Use This Chest FREE

Moth-Proof Cedar Chest Sent on Free Trial for Xmas

A famous Piedmont Red Cedar Chest. Your choice of 90 styles and designs sent on 15 days' free trial. We pay the freight. A Piedmont protects furs, woolens, and blankets from moths, mice, dust, and damp. Distinctly beautiful. Needed in every home. Lasts for generations. Finest Christmas, wedding, or birthday gift at great saving. *Write today for our Xmas catalogue and reduced prices—all postpaid free.*

Reduced Factory Prices, Freight Prepaid

Piedmont Red Cedar Chest Co., Dept. 8 Statesville, N. C.



For more than 50 years

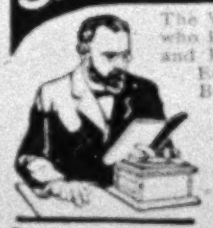
SPRATT'S

have held the premier position as manufacturers of Dog Foods throughout the world. The Best is the Cheapest.

Write for samples and send stamp for Catalogue on Dog Feeding.

SPRATT'S PATENT, Ltd., NEWARK, N. J.

SPEAK A FOREIGN LANGUAGE!



The War has created unlimited opportunities for those who know French, Spanish, Italian, or German. Army, Navy, and Red Cross must know French to gain promotion. Equip yourself to read foreign books and papers. Brush up on the language you studied at school or college and make it of practical use. Acquire a new language at home by the

LANGUAGE-PHONE METHOD

And Rosenthal's Method of Practical Linguistry

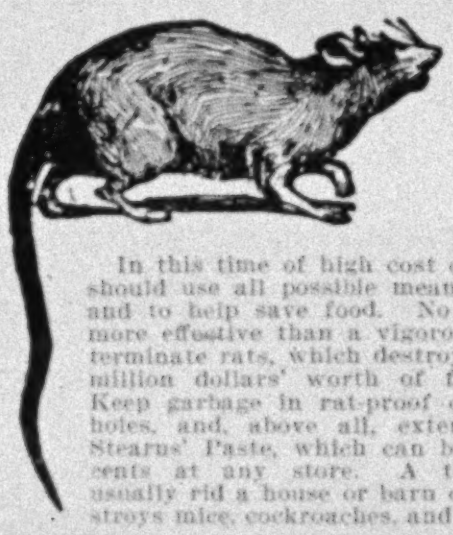
(Highest Award Panama-Pacific Exposition)

This is the natural way to learn. You hear the living voice of a native professor pronounce each word and phrase. He speaks as you desire—slowly or quickly, for minutes or hours at a time. It is a pleasant, fascinating study; no tedious rules or memorizing. It is not expensive—family and friends can use it. You simply practice during spare moments, and in a surprisingly short time you speak, read, and understand a new language.

NOW READY—F. M. C.—French Military Conversation and Military Language-Phone Method, a special short course for War Workers.

Our records fit all talking machines. Write for free Booklet, particulars of Trial Offer, Easy Payments.

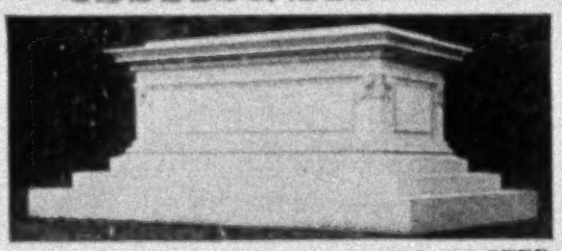
The Language-Phone Method, 980 Putnam Bldg., 2 W. 45th St., N.Y.



HELP TO SAVE NATION'S FOOD SUPPLY

In this time of high cost of living, everybody should use all possible means to prevent waste and to help save food. No one means can be more effective than a vigorous campaign to exterminate rats, which destroy over two hundred million dollars' worth of foodstuffs annually. Keep garbage in rat-proof cans, stop up their holes, and, above all, exterminate them with Stearns' Paste, which can be bought for a few cents at any store. A two-ounce box will usually rid a house or barn of every rat. It destroys mice, cockroaches, and water-bugs as well.

QUALITY



HARRISON MEMORIALS of CHARACTER

Offices in principal cities. Write for Booklet X.

HARRISON GRANITE COMPANY

200 Fifth Avenue, New York City — Works: Barre, Vt.

PERSONAL SERVICE

Lantern Slides from Photographs in National Geographic Magazine

So many requests are being constantly received regarding lantern slides from the copyright photographs in the Geographic that arrangements have been completed to supply them to members of the Society. Slides are not kept in stock, each order being made up as received, and will be delivered within two weeks after receipt of order, unless otherwise advised.

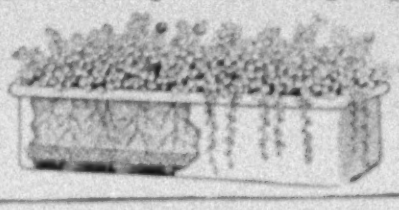
The copyright notice must appear on each slide. The purchase of lantern slides does not carry with it the authority to publish the pictures and they cannot be used for advertising purposes.

Slides cannot be sent upon approval and a remittance must accompany each order. The slides will be carefully packed and sent by express collect. Prices in the United States (standard size), black and white, 75 cents each; colored, $1.50. Address,

Department L, National Geographic Magazine, Washington, D. C.

SAVO FLOWER AND PLANT BOX (All-Year-Round Garden)

Self-Watering and Sub-Irrigating — **For Windows, Porches, and Sun Parlors**



Irrigates the soil thoroughly, supplies the air to the roots continually, rendering the soil mealy and loose throughout the box. Made of heavy galvanized steel, artistic in design, and beautifully finished in Aluminum, Gilt, or Dark Green.

Leak-proof and rust-proof. No surface watering. Pour water in the tube only once a week. You can move Savo Boxes indoors or out and have beautiful Flowers and Plants the year round. Write for Free Illustrated Booklet.

SAVO MANUFACTURING COMPANY, Dept. D. — **39 South La Salle Street, CHICAGO, ILL.**

Manufacturers of the well-known "Savo Air Moistener."

The Story of "Beautiful **birch**"

"THE HARDWOOD THAT MAKES GOOD"

IN this *beautiful*, "Beautiful **birch**" book the story of "America's Favorite Cabinet Wood" is well told.

"Beautiful **birch**" is a hardwood of many uses as well as varied beauties.

You want to know the *real facts* about "Beautiful **birch**," of course, and in this book they are marshaled in forceful fashion—so that the reader may easily grasp them—an interesting story of a *very* interesting wood.

Equally interesting will be the little set of* birch *panels, in the different finishes, including white enamel, that we'll send along when you ask for your copy of the* birch *book. (Today, we hope.)

NORTHERN HEMLOCK & HARDWOOD MFRS' ASSN.
214 F. R. A. Building, Oshkosh, Wisconsin

DENBY
TRUCKS
FOR TRAIL OR PAVEMENT

PERHAPS the greatest reason for the flawless Denby performance records is that the keenest critics of the Denby are found in the organization itself.

Denby Motor Truck Company
Dept. O
Detroit, Michigan

OAK
The Aristocrat of Supremacy in Furniture

OAK, as a CABINET WOOD, is serene in its conscious superiority.

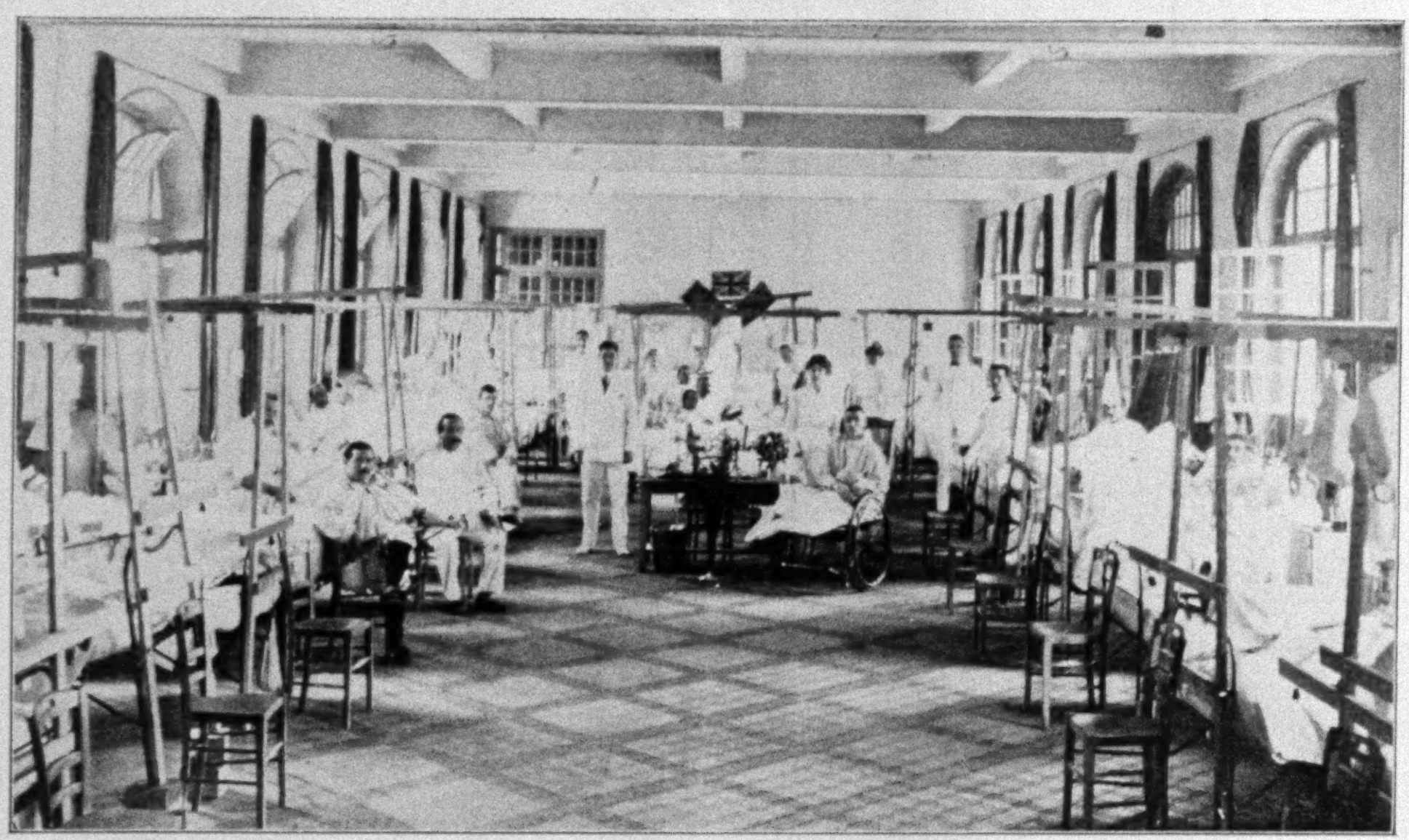
From the aristocratic dignity of the chateau to the sweet homey-ness of the cottage or apartment—and from the earliest middle ages to the present discriminative moment OAK, "that sturdy friend of Art" and "the world's premier hardwood," has remained the first choice of those who combine a knowledge of truly *permanent values* with a sense of the highest artistic adaptability.

Responsive alike to the best skill of the artisan and the artist, OAK combines all the qualities which contribute most to a home whose FURNITURE must (because of the little folks) at the same time impart ideas of beauty, dignity, poise and permanence—and good-naturedly repel the onslaughts of buoyant youth.

"There is no finer heirloom than good OAK furniture." There is no more *safe* and *enduring* investment—none better worth *insisting* upon. *Have you tried INSISTING?*

AMERICAN OAK MANUFACTURERS' ASSOCIATION
write personal letters worth getting. Tell us your special problems.
ADDRESS ROOM 1416, 14 MAIN ST., MEMPHIS, TENN.
ASK FOR BOOKLETS AND FINISHED SAMPLES

The KRYPTOK Bifocal
With clear smooth even surfaces
KRYPTOK GLASSES
THE INVISIBLE BIFOCALS
KRYPTOKS (pronounced Crip-tocks) keep your eyes young in usefulness because they combine near and far vision in one pair of glasses. They keep your eyes young in looks because they are free from the age-revealing seam or hump of old-style double-vision (bifocal) glasses.
Ask your oculist, optometrist, or optician about KRYPTOK glasses.
Write for booklet, "Eyesight Efficiency."
KRYPTOK COMPANY, Inc.
1056 Old South Bldg., Boston, Mass.
The old Bifocal
With the disfiguring seam or hump



SUCH A WARD AS THE NATIONAL GEOGRAPHIC SOCIETY PROPOSES

Note the superstructure over each bed, which is an example of American ingenuity, an apparatus for assisting in the wonderful new system of draining wounds and also for making wounded limbs as comfortable as possible

National Geographic Society Ward

in the

AMERICAN AMBULANCE HOSPITAL

Neuilly, Paris, France

THOUSANDS OF MEMBERS of the National Geographic Society and the sons of a great many more have answered our country's call to arms. Numbers have already gone to France, and others will follow shortly to place the Stars and Stripes side by side with the battle standards of our allies in this titanic struggle for freedom and everlasting peace.

We should not close our eyes to the eventualities that confront our men in action and in camp, because the physical hazard is ever present. For the safe return of your boy or your neighbor's son you can but hope and pray; and yet there is something that you can do—a help that is both practicable and all important, which will reduce that hazard of life and limb and minimize the toll which wound and disease demand.

Will you do your part today and thus prepare for tomorrow? In the American Ambulance Hospital, located at Neuilly (pronounced Nuh yeé), in the environs of Paris, there should be established a

National Geographic Society Ward

Picture to yourself the feeling of one of our fellow-members or his boy upon being brought into this hospital and placed in a comfortable bed provided for him by his own friends. Can you imagine a better tonic or a more comforting thought to a sick or wounded man than the realization that he is almost at home?

The American Hospital at Neuilly, housed in a splendid four-story building built around the four sides of a beautiful court, now takes care of about 1,500 patients a day in its main and auxiliary hospitals. The average number of patients under treatment in the main institution is 454 a day, and these represent the most serious surgical cases. During last year 5,100 serious operations were performed, 135,000 patients were transported in the hospital's ambulances, and the war-harried people of every hamlet within the boundaries of brave France heard of the profound sympathy of America for their trials and of American efforts to "smooth the wrinkled front of grim-visaged war" for them. The hospital was established by American subscriptions in the early days of the war and has been a boon to the sick and wounded that cannot be measured in words.

There will be no overhead expense in the handling of the National Geographic Society's fund, and every dollar will be expended for equipment and maintenance of the ward.

The need is inevitable; therefore subscribe now, because it takes considerable time to secure and transmit equipment to the hospital. No matter how small or how large your subscription, it will be welcome and proper acknowledgment made.

(CUT HERE)

GILBERT H. GROSVENOR,

Chairman, National Geographic Society Ward Fund,

16th and M Streets N. W., Washington, D. C.

I enclose $..... toward the National Geographic Society Ward of the American Ambulance Hospital, Neuilly, France, *thus indicating my belief in preparedness.*

(Name).....

(Address).....

"TOGETHER WE STAND"

"The time has come to conquer or submit."
"For us there is but one choice. We have made it."
—PRESIDENT WILSON.

Subscribe NOW!

for

United States Government Bonds

of the

Second Liberty Loan

These new United States Government Bonds are issued in denominations of $50 and multiples thereof. The United States Treasury will pay you interest at *4% per annum*, payable semi-annually.

EASY PAYMENTS.—You can pay 2% on your bonds when you make your application, 18% November 15, 40% December 15, and 40% January 15, 1918. For example, when you buy a $100 bond, you can pay $2 now, $18 November 15, $40 December 15, and $40 January 15. *YOU CAN GET YOUR BOND AS SOON AS YOU HAVE FULLY PAID FOR IT.* Liberty bonds are the best security in the world. They are readily salable, and are practically exempt from taxation for people of moderate incomes. The law permits their conversion into bonds bearing higher interest, should such bonds be issued by the Government in the future.

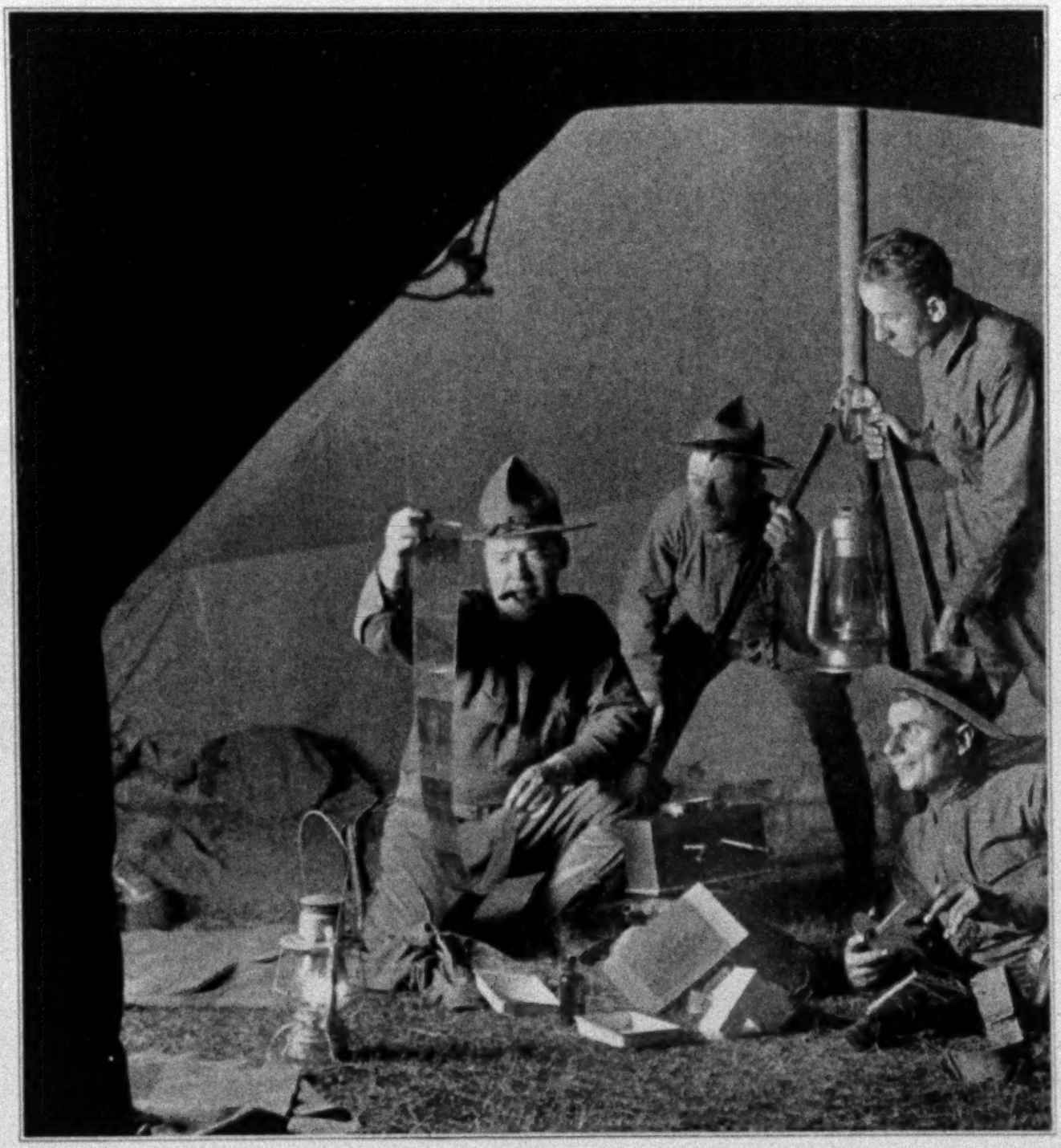
HELP YOUR COUNTRY AND YOURSELF
HELP OUR BOYS "OVER THERE"

Get an official Liberty Loan blank from any Bank or Trust Company

and

SUBSCRIBE NOW!

(THE NATIONAL GEOGRAPHIC MAGAZINE GLADLY CONTRIBUTES THESE ADVERTISING PAGES)



Take a
KODAK
with you.

Wherever you go, there you will find Kodak film to fit your Kodak.

EASTMAN KODAK CO., ROCHESTER, N. Y.

"Emergency Money"

How often the embarrassment of being without ready cash has confronted you! And yet you wisely fear the risk of carrying a large sum in coin or currency.

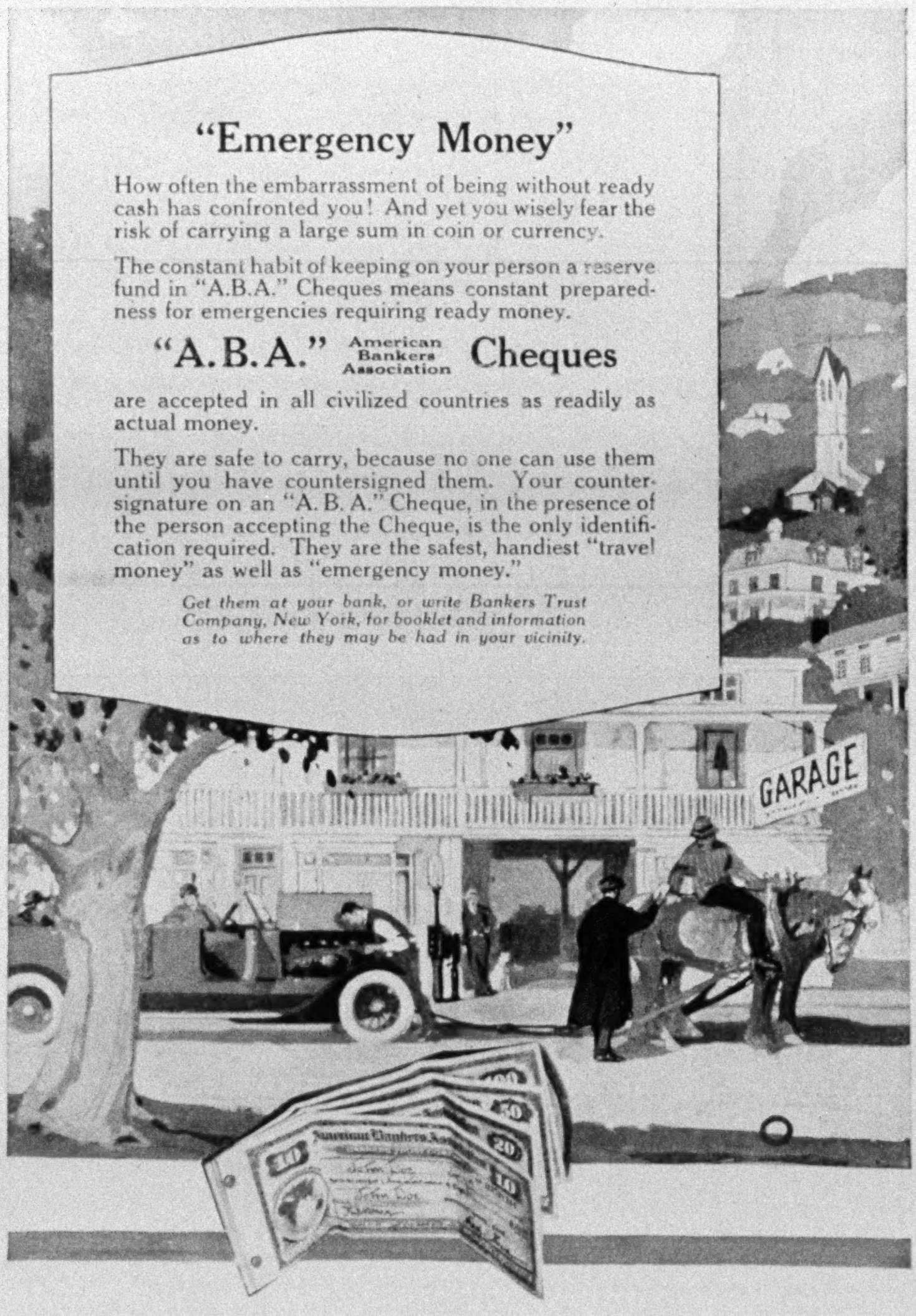
The constant habit of keeping on your person a reserve fund in "A.B.A." Cheques means constant preparedness for emergencies requiring ready money.

"A.B.A." American Bankers Association Cheques

are accepted in all civilized countries as readily as actual money.

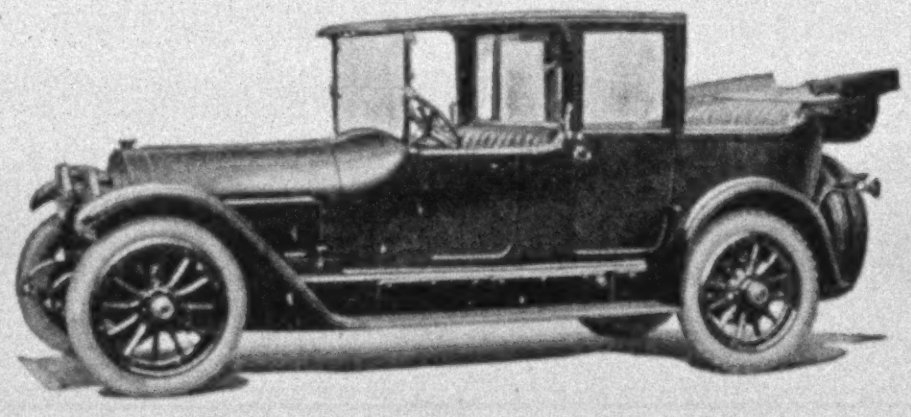
They are safe to carry, because no one can use them until you have countersigned them. Your countersignature on an "A. B. A." Cheque, in the presence of the person accepting the Cheque, is the only identification required. They are the safest, handiest "travel money" as well as "emergency money."

Get them at your bank, or write Bankers Trust Company, New York, for booklet and information as to where they may be had in your vicinity.



LOCOMOBILE

SERIES TWO



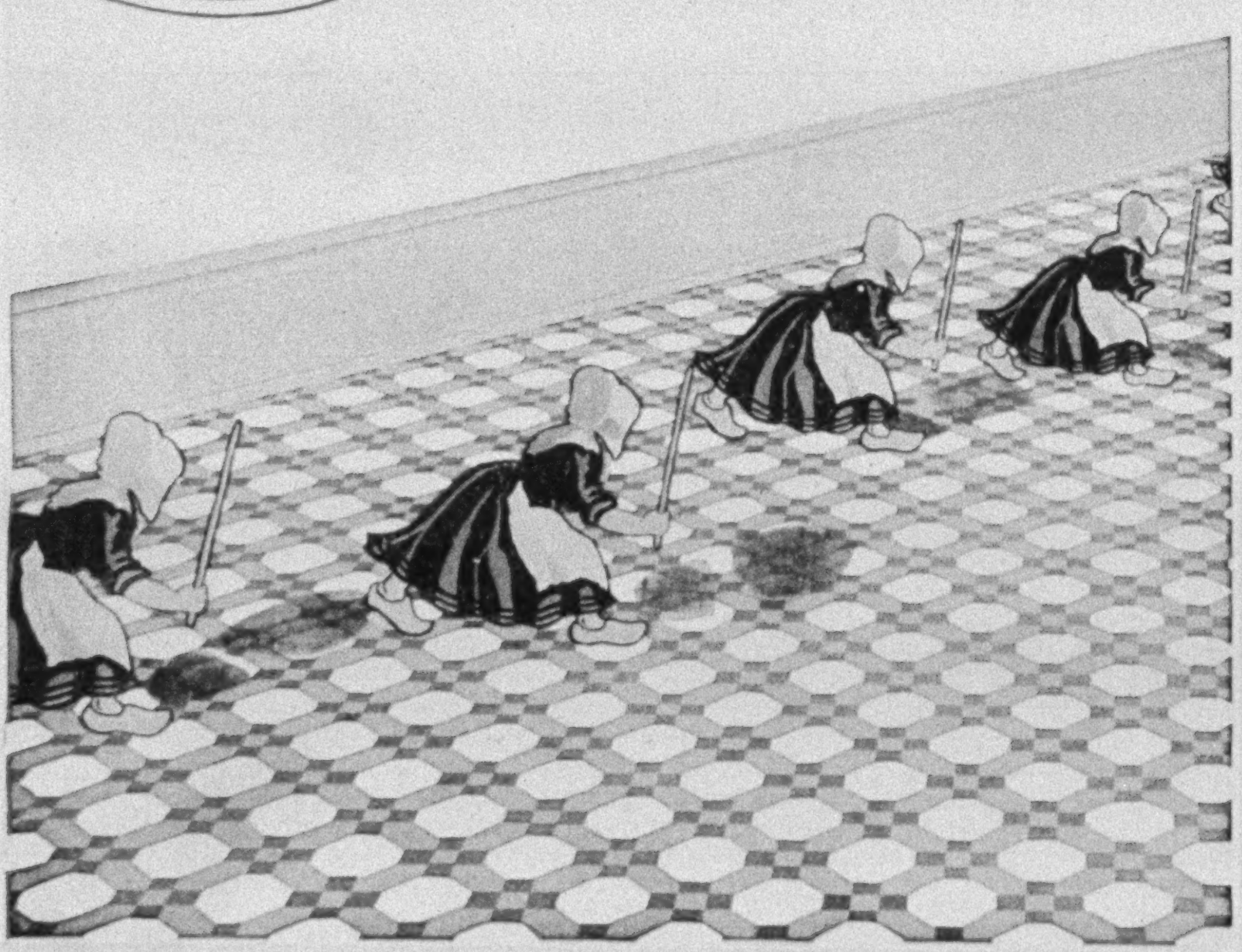
A "Series Two" Closed Car

Greek Architecture, perfect in taste, proportion and detail, will never go out of style. Similarly, Locomobile Closed Coach Work with its classic and conventional design, is an admired and valued possession, year after year. Built on the indestructible Locomobile Chassis, with its record of durability and safety.

THE LOCOMOBILE COMPANY OF AMERICA

MAKERS OF FINE MOTOR CARS

PRESS OF JUDD & DETWEILER, INC.,
WASHINGTON, D. C.

Chases Dirt

Tile
Linoleum
Wood Floors